SUPERO®

# H8DA6+
# H8DA6+-F
# H8DAI+
# H8DAI+-F

## USER'S MANUAL

Revision 1.0c

The information in this User's Manual has been carefully reviewed and is believed to be accurate. The vendor assumes no responsibility for any inaccuracies that may be contained in this document, makes no commitment to update or to keep current the information in this manual, or to notify any person or organization of the updates. **Please Note: For the most up-to-date version of this manual, please see our web site at www.supermicro.com.**

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software and documentation, is the property of Supermicro and/or its licensors, and is supplied only under a license. Any use or reproduction of this product is not allowed, except as expressly permitted by the terms of said license.

IN NO EVENT WILL SUPERMICRO BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPERMICRO SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between manufacturer and customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Super Micro's total liability for all claims will not exceed the price paid for the hardware product.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. "Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate"

## WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

Manual Revision 1.0c
Release Date: April 15, 2010

Unless you request and receive written permission from SUPER MICRO COMPUTER, you may not copy any part of this document.

Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2010 by SUPER MICRO COMPUTER INC.
All rights reserved.
**Printed in the United States of America**

# Preface

## About This Manual

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the H8DA6+/I+(-F). This series includes the following serverboards and characteristics:

| | H8DA6+-F | H8DA6+ | H8DAi+-F, | H8DAi+ |
|---|---|---|---|---|
| Embeded IPMI | Yes | | Yes | |
| Onbard SAS2 | Yes | Yes | | |

The H8DA6+/I+(-F) is based on the AMD® SR5690/SP5100 chipset and supports dual AMD Socket F type processors with up to 128 GB of DDR2-800/667/533 registered ECC SDRAM.

Please refer to the motherboard specifications pages on our web site for updates on supported processors (http://www.supermicro.com/aplus/). This product is intended to be professionally installed.

## Manual Organization

**Chapter 1** includes a checklist of what should be included in your motherboard box, describes the features, specifications and performance of the motherboard and provides detailed information about the chipset.

**Chapter 2** begins with instructions on handling static-sensitive devices. Read this chapter when installing the processor(s) and memory modules and when installing the motherboard in a chassis. Also refer to this chapter to connect the hard disk drives, the various ports, and the power and reset buttons and the system LEDs.

If you encounter any problems, see **Chapter 3**, which describes troubleshooting procedures for the video, the memory and the setup configuration stored in CMOS. For quick reference, a general FAQ (Frequently Asked Questions) section is provided. Instructions are also included for contacting technical support. In addition, you can visit our web site for more detailed information.

**Chapter 4** includes an introduction to BIOS and provides detailed information on running the CMOS Setup utility.

**Appendix A** provides BIOS Error Beep Code Messages.

**Appendix B** lists BIOS POST Checkpoint Codes.

# Table of Contents


## *Chapter 1 Introduction*

1-1 Overview ..... 1
Checklist ..... 1
1-2 Contacting Supermicro ..... 2
1-3 Chipset Overview ..... 10
AMD SR5690/SP5100 Processor ..... 10
HyperTransport Technology ..... 10
1-4 PC Health Monitoring ..... 10
1-5 Power Configuration Settings ..... 11
1-6 Power Supply ..... 12
1-7 Super I/O ..... 13

## *Chapter 2 Installation*

2-1 Static-Sensitive Devices ..... 1
Precautions ..... 1
Unpacking ..... 1
2-2 Processor and Heatsink Installation ..... 2
2-3 Mounting the Motherboard into a Chassis ..... 4
2-4 Installing Memory ..... 5
2-5 PCI Expansion Cards ..... 6
2-6 I/O Port and Control Panel Connections ..... 7
Front Control Panel ..... 7
2-7 Connector Definitions ..... 8
Power Connectors ..... 8
PW_ON Connector ..... 8
Reset Connector ..... 8
Overheat/Fan Fail LED (OH) ..... 8
NIC2 (LAN2) LED ..... 9
NIC1 (LAN1) LED ..... 9
HDD LED ..... 9
Power On LED ..... 9
NMI Button ..... 9
LAN1/2 (Ethernet Ports) ..... 9
Universal Serial Bus Ports ..... 10
USB Headers ..... 10
Fan Headers ..... 10
Serial Ports ..... 10

SGPIO ..... 11
SMBus Header ..... 11
Wake-On-LAN ..... 11
Power I2C ..... 11
Overheat LED ..... 11
Chassis Intrusion ..... 12
Power LED/Speaker ..... 12
ATX PS/2 Keyboard and PS/2 Mouse Ports ..... 12
Compact Flash Card PWR Connector ..... 12
(Back_Panel) High Definition Audio (HD Audio) ..... 13
CD & 10-pin Audio Headers ..... 13
Video Connector ..... 13
IEEE 1394 Connection ..... 14
JS_IBTN1 Connection ..... 14
2-8 Jumper Settings ..... 15
Explanation of Jumpers ..... 15
CMOS Clear ..... 15
I2C to PCI-Express Slot ..... 16
Watch Dog Enable/Disable ..... 16
TPM Support Enable ..... 16
VGA Enable/Disable ..... 16
SAS Enable/Disable ..... 16
LAN Enable/Disable ..... 17
Compact Flash Master/Slave Select ..... 17
Audio Mode Select ..... 17
IEEE 1394 Firewire Enable/Disable ..... 17
2-9 Onboard Indicators ..... 18
LAN1/LAN2 LEDs ..... 18
Dedicated IPMI LAN LEDs ..... 18
BMC Heartbeat LED ..... 18
Power LED ..... 18
SAS2008 Heartbeat LED ..... 18
2-10 Floppy, IDE, SAS and SATA Drive Connections ..... 19
IDE Connectors ..... 19
SATA Ports ..... 20
SAS Ports ..... 20
2-11 Enabling SATA RAID ..... 20
Serial ATA (SATA) ..... 20

Installing the OS/SATA Driver ..... 21
Building a Driver Diskette ..... 21
Enabling SATA RAID in the BIOS ..... 21
Using the Adaptec RAID Utility ..... 23
Installing the RAID Driver During OS Installation ..... 23
2-12 Installing Drivers ..... 24
Supero Doctor III ..... 25

***Chapter 3 Troubleshooting***

3-1 Troubleshooting Procedures ..... 1
Before Power On ..... 1
No Power ..... 1
No Video ..... 2
Memory Errors ..... 2
Losing the System's Setup Configuration ..... 2
3-2 Technical Support Procedures ..... 3
3-3 Frequently Asked Questions ..... 3
3-4 Returning Merchandise for Service ..... 4

***Chapter 4 BIOS***

4-1 Introduction ..... 1
4-2 Main Menu ..... 2
4-3 Advanced Settings Menu ..... 2
4-4 Security Menu ..... 16
4-5 Boot Menu ..... 16
4-6 Exit Menu ..... 17

***Appendix A BIOS Error Beep Codes***

***Appendix B BIOS POST Checkpoint Codes***

B-1 Uncompressed Initialization Codes ..... 1
B-2 Bootblock Recovery Codes ..... 2
B-3 Uncompressed Initialization Codes ..... 3

# Chapter 1

# Introduction

## 1-1 Overview

### Checklist

Congratulations on purchasing your computer motherboard from an acknowledged leader in the industry. Supermicro boards are designed with the utmost attention to detail to provide you with the highest standards in quality and performance.

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

- One (1) H8DA6+/I+(-F) serverboard (either H8DA6+-F, H8DA6+, H8DAi+-F or H8DAi+)
- One (1) CD containing drivers and utilities
- One (1) 9-pin Serial Port cable (CBL-0010L)
- One (1) ATA 66/100 IDE LP cable (CBL-0036L-03)
- Four (4) (Six (6) for H8DAi+(-F) boards) 2ft. Amphenol, SATA cables (CBL-0044L)
- Two (2) 50cm IPASS TO 4 SATA cables (CBL-0097L-02) (H8DA6+(-F) boards only)
- One (1) Standard I/O shield (MCP-260-00025-0N)
- Two (2) Retention Brackets (BKT-0012L)

## 1-2 Contacting Supermicro

### Headquarters


| | |
|---|---|
| Address: | Super Micro Computer, Inc. |
| | 980 Rock Ave. |
| | San Jose, CA 95131 U.S.A. |
| Tel: | +1 (408) 503-8000 |
| Fax: | +1 (408) 503-8008 |
| Email: | marketing@supermicro.com (General Information) |
| | support@supermicro.com (Technical Support) |
| Web Site: | www.supermicro.com |

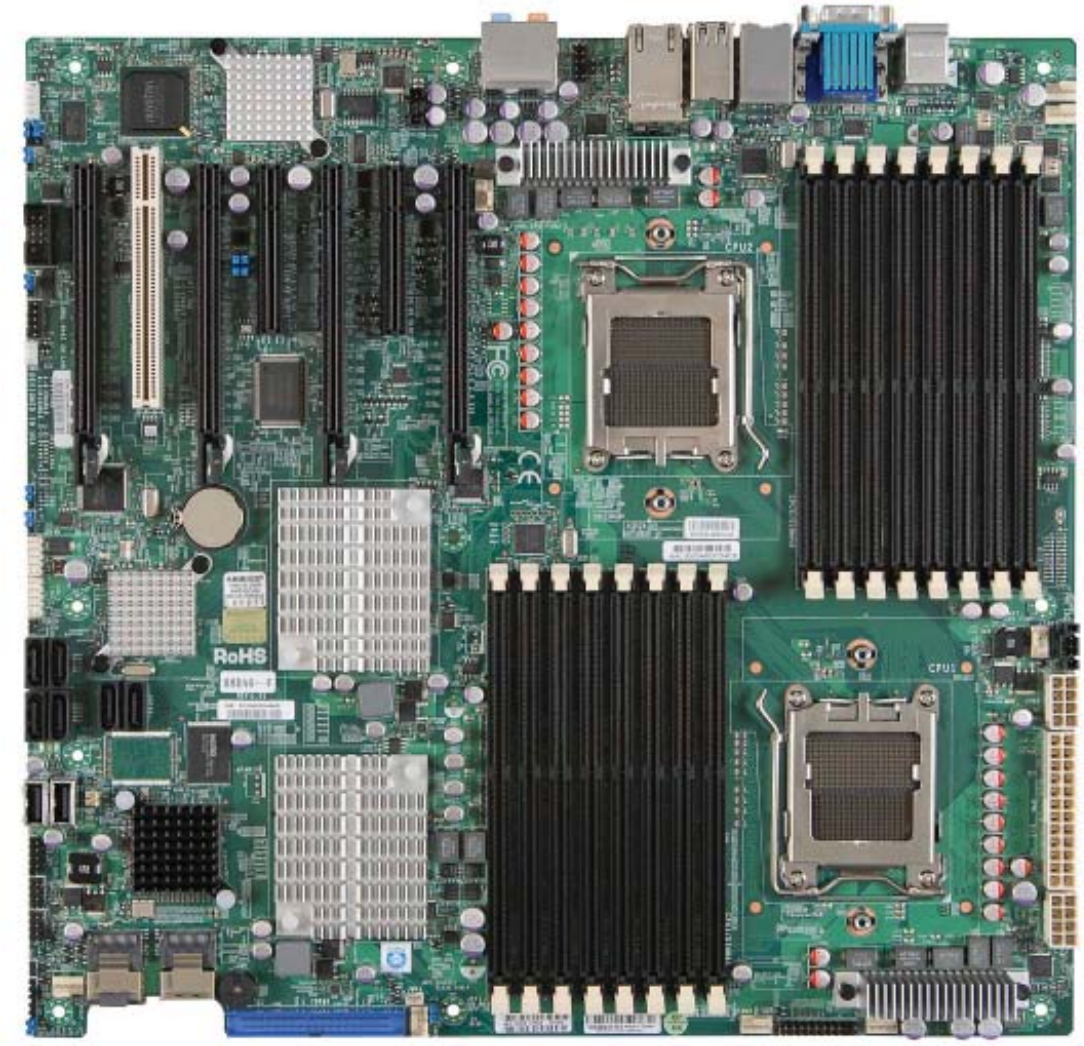

### Europe


| | |
|---|---|
| Address: | Super Micro Computer B.V. |
| | Het Sterrenbeeld 28, 5215 ML |
| | 's-Hertogenbosch, The Netherlands |
| Tel: | +31 (0) 73-6400390 |
| Fax: | +31 (0) 73-6416525 |
| Email: | sales@supermicro.nl (General Information) |
| | support@supermicro.nl (Technical Support) |
| | rma@supermicro.nl (Customer Support) |


### Asia-Pacific

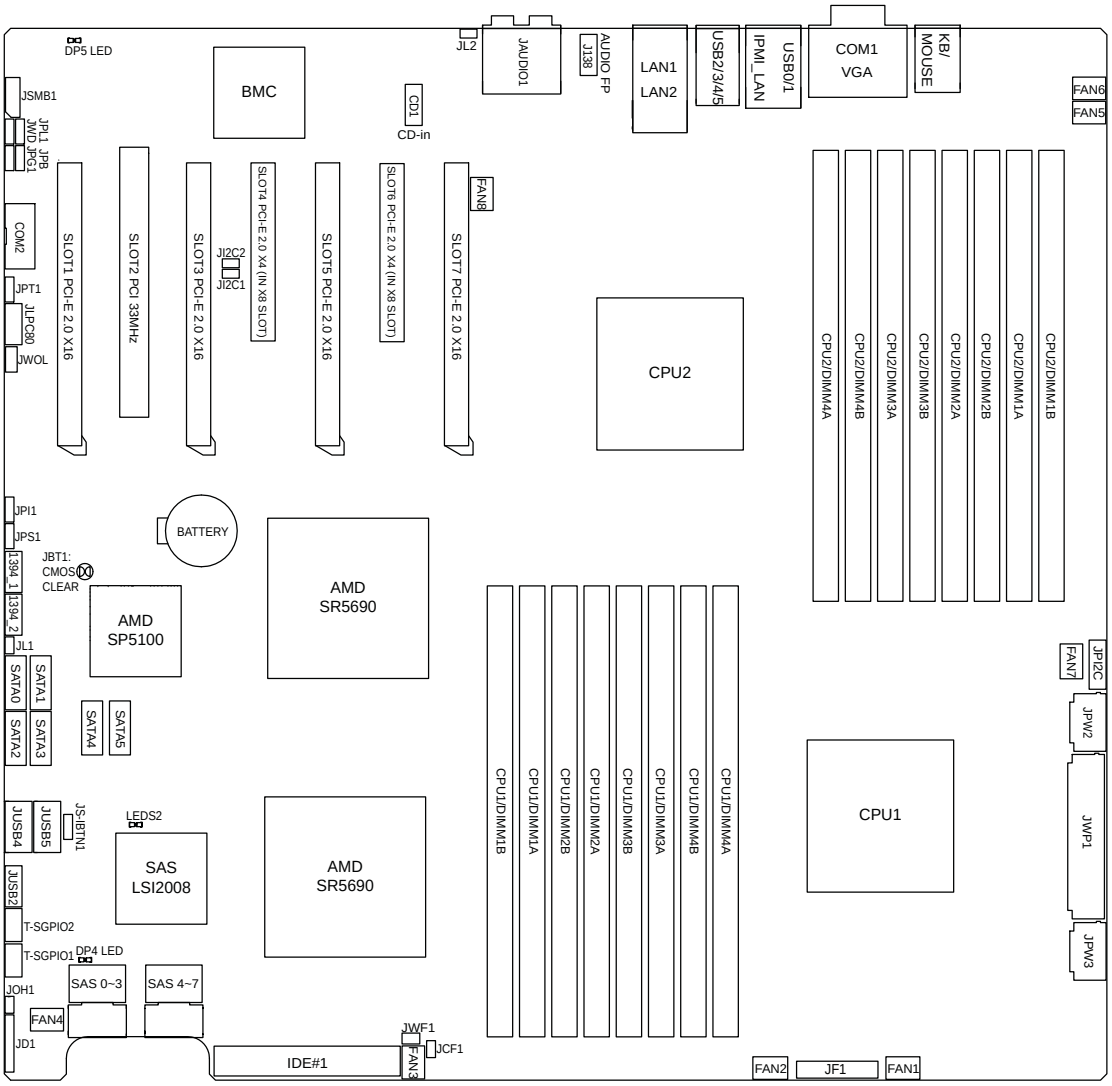

| | |
|---|---|
| Address: | Super Micro Computer, Inc. |
| | 4F, No. 232-1, Liancheng Rd. |
| | Chung-Ho 235, Taipei County |
| | Taiwan, R.O.C. |
| Tel: | +886-(2) 8226-3990 |
| Fax: | +886-(2) 8226-3991 |
| Web Site: | www.supermicro.com.tw |
| Technical Support: | |
| Email: | support@supermicro.com.tw |
| Tel: | 886-2-8228-1366, ext.132 or 139 |

**Figure 1-1. H8DA6+/I+(-F) Serverboard Image**




**Note:** The H8DAi+(-F) serverboard does not have onboard SAS support integrated.

**Figure 1-2. H8DA6+/I+(-F) Serverboard Layout**
(not drawn to scale)




**Notes:**

Jumpers not indicated are for test purposes only.

Jumper JS_IBTN1 is only available on H8DA6+-F and H8DA6+ serverboards.

## H8DA6+/I+(-F) Quick Reference

| Jumper | Description | Default Setting |
|---|---|---|
| JBT1 | CMOS Clear | (See Section 2-7) |
| JCF1 | Compact Flash Master/Slave | Closed (Master) |
| JI²C1/JI²C2 | I²C to PCI-E Slot Enable/Disable | Both Closed (Enabled) |
| JL2 | Audio Mode Select | Open (HD Mode) |
| JPG1 | VGA Enable/Disable | Pins 1-2 (Enabled) |
| JPI1 | IEEE 1394 Firewire Enable | Pins 1-2 (Enabled) |
| JPL | LAN Enable/Disable | Pins 1-2 (Enabled) |
| JPS1 | SAS Controller Enable/Disable | Pins 1-2 (Enabled) |
| JPT1 | Trusted Platform Modules Jumper | Pins 1-2 (Enabled) |
| JWD | Watch Dog | Pins 1-2 (Reset) |

| LED | Description |
|---|---|
| LAN Ports | LEDs for the LAN Ethernet ports |
| Dedicated IPMI LAN | LEDs for the dedicated IPMI LAN Ethernet port |
| DP5 | LED for BMC Activity |
| DP4 | Power LED |
| LEDS2 | SAS2008 heartbeat LED |

| Connector | Description |
|---|---|
| 1394_1/1394_2 | IEEE 1394 Firwire connectors |
| COM1/COM2 | COM1 Serial Port/Header |
| FAN 1-8 | Chassis/CPU Fan Headers |
| (HD) Audio/CD-In/FP Audio | 7.1 Channel High Definition Audio (JAUDIO1)/CD-In (CD-1)/Front Panel Audio (J138) |
| IDE#1 | IDE Drive Connector |
| IPMI LAN | Dedicated IPMI LAN Port |
| JD1 | Speaker Header |
| JF1 | Front Panel Connector |
| JS_IBTN1 | AOC-IMRRAKEY-2008-LSI Connector/ |
| JL1 | Chassis Intrusion Header |
| JOH1 | Overheat Warning Header |
| JPI2C | Power $I^2C$ Header |
| JPW1 | 24-pin Main ATX Power Connector |
| JPW2/3 | +12V 8-pin CPU Power Connectors |
| JSMB1 (SMBus) | System Management Bus Header |
| JWF1 | Compact Flash Card Power Connector |
| JWOL | Wake-On-LAN Header |
| LAN1/2 | Gigabit Ethernet (RJ45) Ports |
| PS2 Mouse/Keyboard | PS2 Mouse/Keyboard connectors |
| SAS0~3, SAS4~7 | SAS Ports |
| SATA0 ~ SATA5 | SATA Ports |
| T-SGPIO-1/TSGPIO-2 | Serial General Purpose Input/Output Headers |
| USB0/1, USB2/3/4/5, JUSB2, JUSB4/5 | Universal Serial Bus (USB) Ports, Headers, Type-A Ports |
| VGA | VGA Connector |

# Motherboard Features

## CPU

- Dual AMD Opteron 2000 series (Socket F type) processors

**Note: Supports 237x, 238x, 235x and 24xx processors. Please refer to our web site for further details on supported processors.**

**Note: This serverboard requires that two CPUs be installed to have full function support.**

## Memory

- Sixteen single/dual channel DIMM slots supporting up to 128 GB of DDR2-800/667/533 registered ECC SDRAM

**Note: Due to a CPU specification, f**ully populating DIMM slots with DDR2-800/667 memory downgrades the speed to DDR2 533 MHz (see our web site for possible updates to this). **Refer to Section 2-4 before installing memory and our web site for recommended DIMMs.**

## Chipset

- Two AMD SR5690 and one AMD SP5100 chipsets

## Expansion Slots

- Four (4) PCI-Express x16 Gen 2 slots
- Two (2) PCI-Express x4 (in x8) Gen 2 slots
- One (1) PCI slot

## BIOS

- 16 Mb AMIBIOS® SPI Flash ROM
- APM 1.2, DMI 2.3, PCI 2.2, ACPI 1.0 (ACPI 2.0 is BIOS supported), SMBIOS 2.3, Plug and Play (PnP), BIOS Rescue hot keys, USB Keyboard support, Hardware BIOS Virus protection, RTC Wakeup

## PC Health Monitoring

- Onboard voltage monitors
- Fan status monitor with firmware/software on/off and speed control
- Watch Dog
- Environmental temperature monitoring via BIOS
- Power-up mode control for recovery from AC power loss
- System resource alert (via included utility program)
- Auto-switching voltage regulator for the CPU core
- CPU thermal trip support
- $I^2C$ temperature sensing logic

### ACPI Features

- Microsoft OnNow
- Slow blinking LED for suspend state indicator
- BIOS support for USB keyboard
- Wake-On-LAN (WOL) and Wake-On-Ring (WOR) headers
- Internal/external modem ring-on

### Onboard I/O

- On-chip SATA controller supporting six (6) SATA ports (RAID 0, 1, 10 supported)
- One (1) UDMA IDE 133/100 port
- LSI 2008 8-port SAS2 controller supports two (2) I-Pass connectors (H8DA6+ and H8DA6+-F only) and supports RAID 0, 1, 10 and JBOD. Optional RAID-5 Support with AOC-IMRRAKEY-2008-LSI key.
- Two (2) IEEE 1394 single ports w/header
- Two (2) Fast UART 16550 compatible serial port (one header and one port)
- Ten (10) USB (Universal Serial Bus 2.0) ports (6x rear, 2x header, 2x type A)
- Onboard Intel® 82576 dual port Ethernet controller for 10/100/1000Base-T support for two (2) LAN ports
- One (1) dedicated IPMI LAN port (H8DA6+-F and H8DAi+-F only)
- Onboard Matrox® G200 graphics controller (with 16 MB DDR2 memory) supports one (1) VGA port
- 7.1 HD Audio ports (ALC888 chip)

### Other

- Onboard power LED
- Chassis intrusion detection

### CD Utilities

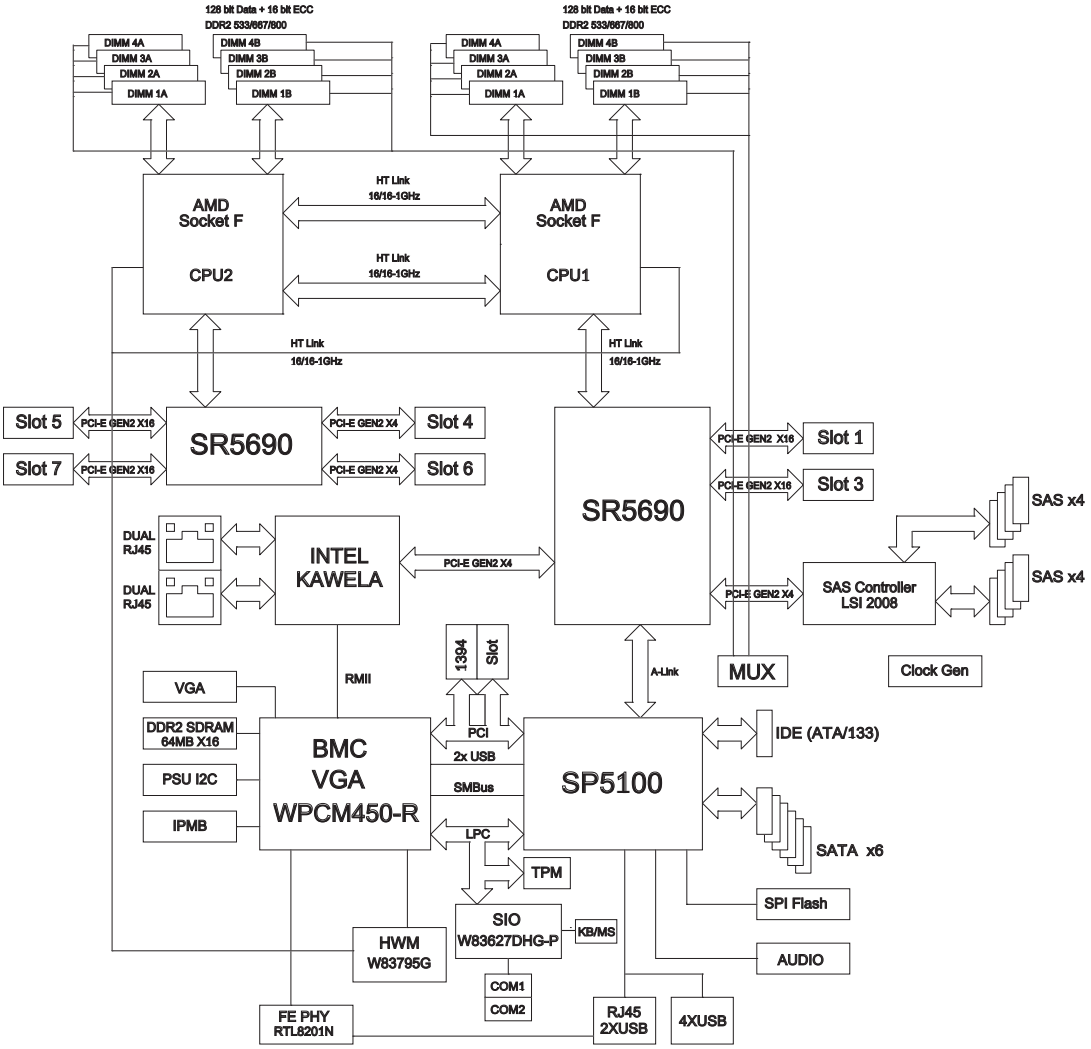
- BIOS flash upgrade utility
- Super Doctor III
- IPMI 1.5 / 2.0 (Optional)

### Dimensions

- Extended ATX form: 13.68" x 13.05" (347 x 331 mm)

**Figure 1-3. AMD SR5690/SP5100 Chipset: System Block Diagram**

**Note:** This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard.



## 1-3 Chipset Overview

The H8DA6+/I+(-F) motherboard is based on the AMD SR5690/SP5100 chipset. This chipset functions as a Media and Communications Processor (MCP). Controllers for the system memory are integrated directly into AMD Opteron processors.

### AMD SR5690/SP5100 Processor

The AMD SR5690 is a single-chip, high-performance HyperTransport peripheral controller. It includes a 46-lane PCI Express interface, an AMD Opteron 16-bit Hyper Transport interface link and a dual-port Gb Ethernet interface. This systemboard contains two of these chips. Each chip connects directly to a CPU and to different peripheral devices.

The SP5100 is a single chip peripheral controller that connects to the system's SATA drives, a 6-port Serial ATA interface, a 10-port USB 2.0 interface and other peripheral devices as a secondary controller.

### HyperTransport Technology

HyperTransport technology is a high-speed, low latency point to point link that was designed to increase the communication speed by a factor of up to 48x between integrated circuits. This is done partly by reducing the number of buses in the chipset to reduce bottlenecks and by enabling a more efficient use of memory in multi-processor systems. The end result is a significant increase in bandwidth within the chipset.

## 1-4 PC Health Monitoring

This section describes the PC health monitoring features of the H8DA6+/I+(-F) . The motherboard has an onboard System Hardware Monitor chip that supports PC health monitoring.

### Onboard Voltage Monitors

The onboard voltage monitor will continuously scan crucial voltage levels. Once a voltage becomes unstable, it will give a warning or send an error message to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor. Real time readings of these voltage levels are all displayed in BIOS.

### Fan Status Monitor with Firmware/Software Speed Control

The PC health monitor can check the RPM status of the cooling fans. The onboard fans are controlled by thermal management via BIOS.

### CPU Overheat/Fan Fail LED and Control

This feature is available when the user enables the CPU overheat/Fan Fail warning function in the BIOS. This allows the user to define an overheat temperature. When this temperature is exceeded or when a fan failure occurs, the Overheat/Fan Fail warning LED is triggered.

### Auto-Switching Voltage Regulator for the CPU Core

The 5-phase-switching voltage regulator for the CPU core can support up to 80A and auto-sense voltage IDs ranging from 0.8 V to 1.55V. This will allow the regulator to run cooler and thus make the system more stable.

## 1-5 Power Configuration Settings

This section describes the features of your motherboard that deal with power and power settings.

### Microsoft OnNow

The OnNow design initiative is a comprehensive, system-wide approach to system and device power control. OnNow is a term for a PC that is always on but appears to be off and responds immediately to user or other requests.

### Slow Blinking LED for Suspend-State Indicator

When the CPU goes into a suspend state, the chassis power LED will start blinking to indicate that the CPU is in suspend mode. When the user presses any key, the CPU will wake-up and the LED will automatically stop blinking and remain on.

### BIOS Support for USB Keyboard

If a USB keyboard is the only keyboard in the system, it will function like a normal keyboard during system boot-up.

### Main Switch Override Mechanism

The power button can function as a system suspend button. When the user depresses the power button, the system will enter a SoftOff state. The monitor will be suspended and the hard drive will spin down. Depressing the power button again will cause the whole system to wake-up. During the SoftOff state, the power supply provides power to keep the required circuitry in the system alive. In case the system malfunctions and you want to turn off the power, just depress and hold the power button for 4 seconds. The power will turn off and no power will be provided to the motherboard.

### Wake-On-LAN (WOL)

Wake-On-LAN is defined as the ability of a management application to remotely power up a computer that is powered off. Remote PC setup, up-dates and access tracking can occur after hours and on weekends so that daily LAN traffic is kept to a minimum and users are not interrupted. The motherboard has a 3-pin header (WOL) to connect to the 3-pin header on a Network Interface Card (NIC) that has WOL capability. Wake-On-LAN must be enabled in BIOS.

### Wake-On-Ring Header (WOR)

Wake-up events can be triggered by a device such as the external modem ringing when the system is in the SoftOff state.

## 1-6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates.

The H8DA6+/I+(-F) requires the use of proprietary power supplies. Please refer to the pinout information for the power connectors in Section 6 of Chapter 2 for detailed information on power requirements.

In areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

**Warning:** To prevent the possibility of explosion, do not use the wrong type of onboard CMOS battery or install it upside down.

## 1-7 Super I/O

The disk drive adapter functions of the Super I/O Winbond® BMC chip includes a floppy disk drive controller that is compatible with industry standard 82077/765, a data separator, write pre-compensation circuitry, decode logic, data rate selection, a clock generator, drive interface control logic and interrupt and DMA logic. The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives.

The Super I/O provides two high-speed, 16550 compatible serial communication ports (UARTs), one of which supports serial infrared communication. Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through a SMI or SCI function pin. It also features auto power management to reduce power consumption.

The IRQs, DMAs and I/O space resources of the Super I/O can be flexibly adjusted to meet ISA PnP requirements, which support ACPI and APM (Advanced Power Management).

# Notes

# Chapter 2

# Installation

## 2-1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.
- Use only the correct type of CMOS onboard battery as specified by the manufacturer. Do not install the CMOS onboard battery upside down, which may result in a possible explosion.

### Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

## 2-2 Processor and Heatsink Installation

*Exercise extreme caution when handling and installing the processor. Always connect the power cord last and always remove it before adding, removing or changing any hardware components.*

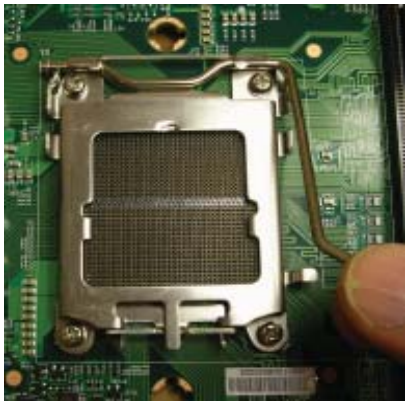
### *Installation Procedure*

Follow the procedures as listed below to install the serverboard into a chassis.

1. Install the processor(s) and the heatsink(s).
2. Install the serverboard in the chassis.
3. Install the memory and add-on cards.
4. Finally, connect the cables and install the drivers.

### *Installing the Processors*

1. Begin by removing the cover plate that protects the CPU. Lift the lever on the CPU socket until it points straight up. With the lever raised, lift open the silver CPU retention plate.



**Triangles**

2. Use your thumb and your index finger to hold the CPU. Locate and align pin 1 of the CPU socket with pin 1 of the CPU. Both are marked with a triangle.

3. Align pin 1 of the CPU with pin 1 of the socket. Once aligned, carefully place the CPU into the socket. *Do not drop the CPU on the socket, move the CPU horizontally or vertically or rub the CPU against the socket or against any pins of the socket, which may damage the CPU and/or the socket*.

4. With the CPU inserted into the socket, inspect the four corners of the CPU to make sure that it is properly installed and flush with the socket. Then, gently lower the silver CPU retention plate into place.

5. Carefully press the CPU socket lever down until it locks into its retention tab. For a dual-CPU system, repeat these steps to install another CPU into the CPU#2 socket (and into CPU#2, #3 and #4 sockets for a quad-CPU configuration).

**Note:** in single and dual-CPU configurations, memory must be installed in the DIMM slots associated with the installed CPU(s). Memory is limited to a maximum of 32 for single CPU and 64 GB for dual CPU configurations.

### *Installing the Heatsinks*

We recommend the use of active type heatsinks (except for 1U systems). Use any onboard fan header for the CPU's heatsink fan. To install the heatsink, please follow the installation instructions included with your heatsink package (not included).

## 2-3 Mounting the Motherboard into a Chassis

All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly.

***Check the Compatibility of the Motherboard Ports and the I/O Shield***

1. The H8DA6+/I+(-F) motherboard requires a chassis that can support a board of 13.68" x 13.05" in size. It was designed to be used in a Supermicro SC747 or 2U above chassis systems.

2. Make sure that the I/O ports on the motherboard align with their respective holes in the I/O shield at the rear of the chassis.

***Mounting the Motherboard onto the Tray in the Chassis***

1. Carefully mount the motherboard onto the motherboard tray by aligning the motherboard mounting holes with the raised metal standoffs in the tray.

2. Insert screws into all the mounting holes in the motherboard that line up with the standoffs.

3. Then use a screwdriver to secure the motherboard to the mainboard tray - tighten until just snug (if too tight you might strip the threads). Metal screws provide an electrical contact to the motherboard ground to provide a continuous ground for the system.

## 2-4 Installing Memory

***Installing Memory***

1. Insert each memory module vertically into its slot, paying attention to the notch along the bottom of the module to prevent inserting the module incorrectly (see Figure 2-1).

2. Install to slots CPU1/DIMM1A and CPU1/DIMM1B first, then to CPU1/DIMM2A and CPU1/DIMM2B, etc. Always install in pairs and in the numerical order of the DIMM slots. See support information below.

3. Gently press down on the memory module until it snaps into place.

4. With two CPUs installed, repeat step 2 to populate the CPU2 DIMM slots. Always install pairs of DIMMs to both CPU DIMM slots for more efficient operation.

**Note:** 256 MB, 512 MB, 1 GB, 2 GB, 4 GB and 8 GB memory modules are supported. It is highly recommended that you remove the power cord from the system before installing or changing memory modules. Please refer to our web site for memory that has been tested on the H8DA6+/I+(-F) serverboard.

### Support

The H8DA6+/I+(-F) supports single or dual-channel, DDR2-667/533/400 registered ECC SDRAM. Only interleaved memory is supported, so you must populate two DIMM slots at a time (see procedure above).

Populating two adjacent slots at a time with memory modules of the same size and type will result in interleaved (128-bit) memory, which is faster than non-interleaved (64-bit) memory. **Note:** Due to a CPU limitation, fully populating DIMM slots with DDR2-667 will pull the speed down to 533 MHz. Please see our web site for possible updates to this limitation.

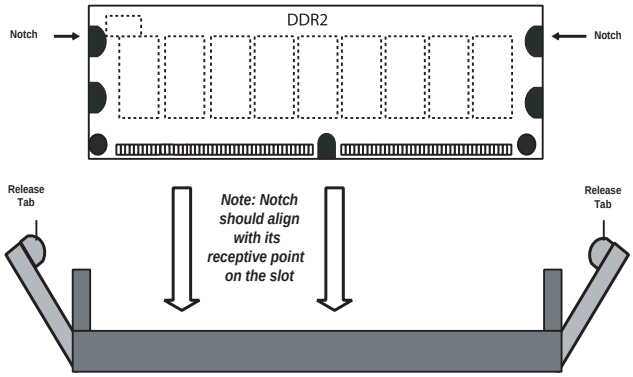
### Maximum Memory

The H8DA6+/I+(-F) supports a maximum of 128 GB of DDR2-800/667/533 registered ECC SDRAM.

*Exercise extreme caution when installing or removing memory modules to prevent any possible damage.*

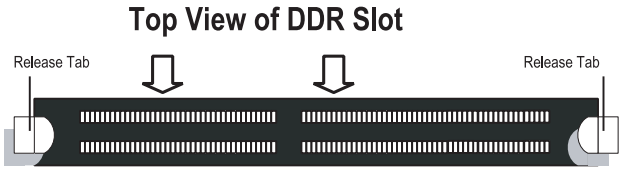
**Figure 2-1. Side and Top Views of DDR Installation**

**To Install:**
Insert module vertically and press down until it snaps into place. The release tabs should close - if they do not you should close them yourself.




Note the notch in the slot and on the bottom of the DIMM. These prevent the DIMM from being installed incorrectly.

**To Remove:**
Use your thumbs to gently push each release tab outward to release the DIMM from the slot.




## 2-5 PCI Expansion Cards

A riser card is used to support one standard size (full height full length) PCI expansion card.

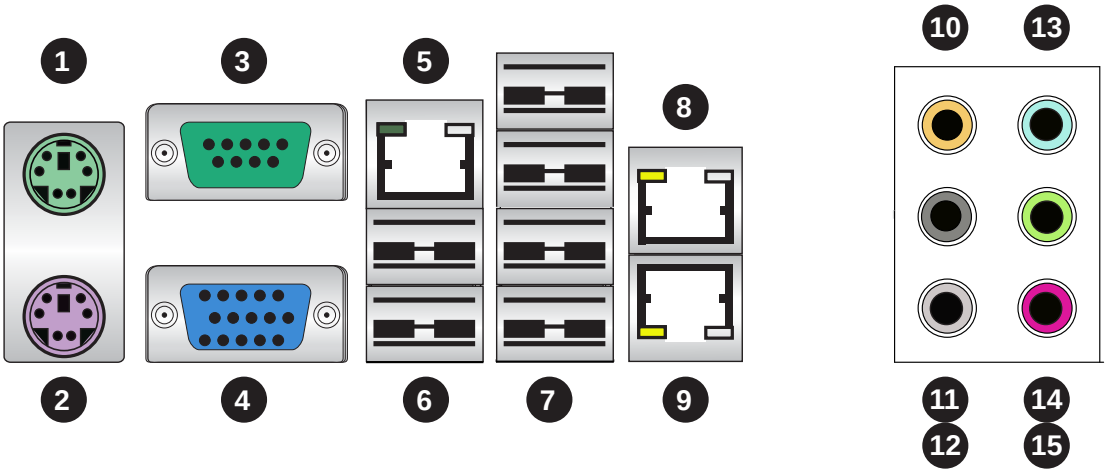
***Installing a PCI Expansion Card***

1. Confirm that you have the correct riser card for your chassis model and the add-on card includes a standard bracket.
2. Remove the chassis cover.
3. Install the riser card by sliding card into the appropriate riser card in the motherboard.
4. Choose the PCI slot shield in which to place the add-on card.
5. In that slot, open the PCI slot shield lever and slide the shield sideways.
6. From inside the chassis, remove the PCI slot shield.
7. Slide the add-on card into the riser card and attach the add-on card bracket in place of the PCI slot shield.
8. Secure the add-on card by closing the PCI slot shield lever.
9. Connect cables to the add-on card as necessary.

## 2-6 I/O Port and Control Panel Connections

The I/O ports are color coded in conformance with the PC99 specification to make setting up your system easier. See Figure 2-2 below for the colors and locations of the various I/O ports.

**Figure 2-2. I/O Port Locations and Definitions**

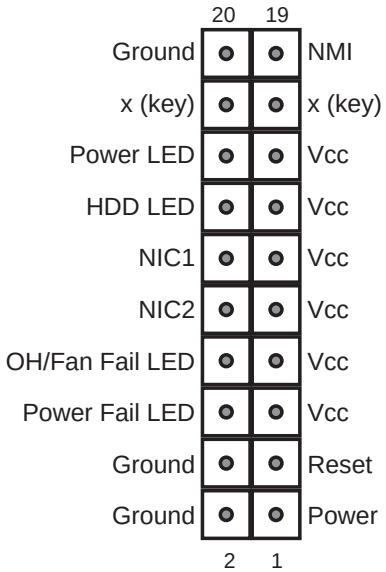



| Rear I/O Ports | | |
|---|---|---|
| 1. PS/2 Mouse | 6. USB 0/1 | 11. Back Surround |
| 2. PS/2 Keyboard | 7. USB 2/3/4/5 | 12. Side Surround |
| 3. COM Port | 8. LAN1 | 13. Line In |
| 4. VGA Port | 9. LAN2 | 14. Front |
| 5. IPMI LAN Port | 10. CEN/LFE | 15. Microphone In |

### Front Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 2-3 for the pin definitions of the various connectors. Refer to Section 2-6 for details.

**Figure 2-3. JF1: Front Control Panel Header (JF1)**



# 2-7 Connector Definitions

### Power Connectors

A 24-pin main power supply connector(JPW1) and two 8-pin CPU PWR connectors (JPW2/JPW3) on the motherboard. These power connectors meet the SSI EPS 12V specification. In addition to the 24-pin ATX power connector, the 12V 8-pin CPU PWR connectors at JPW2/JPW3 must also be connected to your power supply. See the table on the right for pin definitions.

**Warning**: To prevent damage to the power supply or motherboard, please use a power supply that contains a 24-pin and two 8-pin power connectors. Be sure to connect these connectors to the 24-pin (JPW1) and the two 8-pin (JPW2,JPW3) power connectors on the motherboard. Failure in doing so will void the manufacturer warranty on your power supply and motherboard.

**ATX Power 24-pin Connector Pin Definitions**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 13 | +3.3V | 1 | +3.3V |
| 14 | -12V | 2 | +3.3V |
| 15 | COM | 3 | COM |
| 16 | PS_ON | 4 | +5V |
| 17 | COM | 5 | COM |
| 18 | COM | 6 | +5V |
| 19 | COM | 7 | COM |
| 20 | Res (NC) | 8 | PWR_OK |
| 21 | +5V | 9 | 5VSB |
| 22 | +5V | 10 | +12V |
| 23 | +5V | 11 | +12V |
| 24 | COM | 12 | +3.3V |

**12V 8-pin PWR Connector Pin Definitions**

| Pins | Definition |
|---|---|
| 1 through 4 | Ground |
| 5 through 8 | +12V |

**Required Connection**

### PW_ON Connector

The PW_ON connector is on pins 1 and 2 of JF1. This header should be connected to the chassis power button. See the table on the right for pin definitions.

**Power Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 1 | PW_ON |
| 2 | Ground |

### Reset Connector

The reset connector is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

**Reset Button Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 3 | Reset |
| 4 | Ground |

### Overheat/Fan Fail LED (OH)

Connect an LED to the OH connection on pins 7 and 8 of JF1 to provide advanced warning of chassis overheating or fan failure. Refer to the table on the right for pin definitions and status indicators.

**OH/Fan Fail LED Pin Definitions (JF1)**

| Pin# | Definition |
|---|---|
| 7 | Vcc |
| 8 | Control |

**OH/Fan Fail LED Status**

| State | Indication |
|---|---|
| Solid | Overheat |
| Blinking | Fan fail |

### NIC2 (LAN2) LED

The LED connections for LAN2 are on pins 9 and 10 of JF1. Attach LAN LED cables to display network activity. See the table on the right for pin definitions.

| NIC2 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 9 | Vcc |
| 10 | Ground |

### NIC1 (LAN1) LED

The LED connections for LAN1 are on pins 11 and 12 of JF1. Attach LAN LED cables to display network activity. See the table on the right for pin definitions.

| NIC1 LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 11 | Vcc |
| 12 | Ground |

### HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach the hard drive LED cable here to display disk activity (for any hard drives on the system, including SAS, Serial ATA and IDE). See the table on the right for pin definitions

| HDD LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 13 | Vcc |
| 14 | HD Active |

### Power On LED

The Power On LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

| Power LED Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 15 | 5V Stby |
| 16 | Control |

### NMI Button

The non-maskable interrupt button header is located on pins 19 and 20 of JF1. Refer to the table on the right for pin definitions.

| NMI Button Pin Definitions (JF1) | |
|---|---|
| Pin# | Definition |
| 19 | Control |
| 20 | Ground |

### LAN1/2 (Ethernet Ports)

Two Gigabit Ethernet ports (designated LAN1 and LAN2) are located beside the VGA port. Additionally, there is a dedicated LAN poor for IPMI above the two rear USB ports. These Ethernet ports accept RJ45 type cables.

### Universal Serial Bus Ports

Six Universal Serial Bus ports (USB 2.0) are located beside the LAN ports. Two additional Type A ports (USB4/5) are included on the motherboard near the PCI Slot 1. See the table on the right for pin definitions.

**Universal Serial Bus Ports Pin Definitions (USB0/1, USB4/5)**

| USB0 | | USB1 | |
|---|---|---|---|
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |

### USB Headers

Two USB 2.0 headers (USB2/3) are also included on the motherboard. These may be connected to provide front side access. A USB cable (not included) is needed for the connection. See the table on the right for pin definitions.

**Universal Serial Bus Headers Pin Definitions (USB2/3)**

| USB2 | | USB3 | |
|---|---|---|---|
| Pin # | Definition | Pin # | Definition |
| 1 | +5V | 1 | +5V |
| 2 | PO- | 2 | PO- |
| 3 | PO+ | 3 | PO+ |
| 4 | Ground | 4 | Ground |
| 5 | Key | 5 | NC |

**Note:** NC indicates no connection.

### Fan Headers

This motherboard has eight fan headers (Fan1 to Fan8). These 4-pin fans headers are backward compatible with 3-pin fans. However, fan speed control is available for 4-pin fans only. The fan speeds are controlled by the BIOS. See the table on the right for pin definitions

**Fan Header Pin Definitions**

| Pin# | Definition |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Tachometer |
| 4 | PWR Modulation |

### Serial Ports

The COM1 serial port is located beside the VGA port. Refer to the motherboard layout for the location of the COM2 header. See the table on the right for pin definitions.

**Serial Port Pin Definitions (COM1/COM2)**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | RXD | 7 | RTS |
| 3 | TXD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

**Note:** NC indicates no connection.

### SGPIO

The T-SGPIO1/ T-SGPIO2 (Serial General Purpose Input/Output) headers provide a bus between the SATA controller and the backpane to provide SATA enclosure management functions. Connect the appropriate cable from the backplane to these headers to utilize SATA management functions on your system.

**SGPIO Header Pin Definitions (T-SGPIO1)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | NC | 2 | NC |
| 3 | Ground | 4 | Data |
| 5 | Load | 6 | Ground |
| 7 | NC | 8 | NC |

**Note:** NC indicates no connection.

### SMBus Header

The header at SMBus is for the System Management Bus. Connect the appropriate cable here to utilize SMB on the system. See the table on the right for pin definitions.

**SMBus Header Pin Definitions (SMBus)**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | No Connection |

### Wake-On-LAN

The Wake-On-LAN header is designated JWOL. See the table on the right for pin definitions. You must have a LAN card with a Wake-On-LAN connector and cable to use the Wake-On-LAN feature.

**Wake-On-LAN Pin Definitions (JWOL)**

| Pin# | Definition |
|---|---|
| 1 | +5V Standby |
| 2 | Ground |
| 3 | Wake-up |

### Power I2C

The JPI2C header is for power $I^2C$, which may be used to monitor the status of the power supply, fan and system temperature. See the table on the right for pin definitions.

**Power $I^2C$ Pin Definitions (JPI2C)**

| Pin# | Definition |
|---|---|
| 1 | Data |
| 2 | Ground |
| 3 | Clock |
| 4 | NC |

### Overheat LED

Connect an LED to the JOH1 header to provide warning of chassis overheating. See the table on the right for pin definitions.

**Overheat LED Pin Definitions (JOH1)**

| Pin# | Definition |
|---|---|
| 1 | 3.3V |
| 2 | OH Active |

### Chassis Intrusion

A Chassis Intrusion header is located at JL1. Attach the appropriate cable to inform you of a chassis intrusion.

**Chassis Intrusion Pin Definitions (JL1)**

| Pin# | Definition |
|---|---|
| 1 | Battery voltage |
| 2 | Intrusion signal |

### Power LED/Speaker

On the JD1 header, pins 1~3 are used for power LED indication, and pins 4-7 are for the speaker. See the tables on the right for pin definitions. If you wish to use the onboard speaker, you should close pins 6~7 with a jumper. Connect a cable to pins 4~7 of JD1 to use an external speaker.

**PWR LED Connector Pin Definitions**

| Pin Setting | Definition |
|---|---|
| Pin 1 | Anode (+) |
| Pin2 | Cathode (-) |
| Pin3 | NA |

**Speaker Connector Pin Definitions**

| Pin Setting | Definition |
|---|---|
| Pins 4~7 | External Speaker |
| Pins 6~7 | Internal Speaker |

### ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and PS/2 mouse are located next to the Back Panel USB Ports 0~3 on the motherboard. See the table at right for pin definitions.

**PS/2 Keyboard/Mouse Pin Definitions**

| PS2 Keyboard | | PS2 Mouse | |
|---|---|---|---|
| Pin# | Definition | Pin# | Definition |
| 1 | KB Data | 1 | Mouse Data |
| 2 | No Connection | 2 | No Connection |
| 3 | Ground | 3 | Ground |
| 4 | Mouse/KB VCC (+5V) | 4 | Mouse/KB VCC (+5V) |
| 5 | KB Clock | 5 | Mouse Clock |
| 6 | No Connec-tion | 6 | No Connec-tion |

VCC: with 1.5A PTC (current limit)

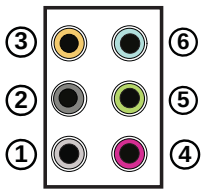
### Compact Flash Card PWR Connector

A Compact Flash Card Power Connector is located at JWF1. For the Compact Flash Card to work properly, you will need to enable with JCF1 and connect a Compact Flash Card power cable to JWF1 first.

### (Back_Panel) High Definition Audio (HD Audio)

This serverboard features a 7.1+2 Channel High Definition Audio (HDA) codec that provides 10 DAC channels. The HD Audio connections simultaneously supports multiple-streaming 7.1 sound playback with 2 channels of independent stereo output for front L&R, rear L&R, center and subwoofer speakers. Use the software included in the CD-ROM with your motherboard to use this feature.

**HD Audio**




| (BP) HD Audio | |
|---|---|
| Conn# | Signal |
| 1 | Side_Surround |
| 2 | Back_Surround |
| 3 | CEN/LFE |
| 4 | Microphone_In |
| 5 | Front |
| 6 | Line_In |

### CD & 10-pin Audio Headers

A 4-pin CD header (CD1) and a 10-pin Front Panel Audio header (J138) are also located on the motherboard. These headers allow you to use the onboard sound for audio CD playback. Connect an audio cable from your CD drive to the CD header that fits your cable's connector. See the tables at right for pin definitions for these headers.

| CD1 Pin Definition | |
|---|---|
| Pin# | Definition |
| 1 | Left |
| 2 | Ground |
| 3 | Ground |
| 4 | Right |

| 10-in Audio Pin Definitions | |
|---|---|
| Pin# | Signal |
| 1 | Microphone_Left |
| 2 | Audio_Ground |
| 3 | Microphone_Right |
| 4 | Audio_Detect |
| 5 | Line_2_Right |
| 6 | Ground |
| 7 | Jack_Detect |
| 8 | Key |
| 9 | Line_2_Left |
| 10 | Ground |

### Video Connector

A Video (VGA) connector is located below the COM Port on the IO backplane. This connector is used to provide video and CRT display.

### IEEE 1394 Connection

Connectors 1394_1 and 1394_2 provide connectivity for IEEE 1394 (Firewire) devices. See the tables on the right for pin definitions.

**1394_1 Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | PTPAO+ | 2 | PTPAO- |
| 3 | GND | 4 | GND |
| 5 | PTPB1+ | 6 | PTPB1- |
| 7 | PWR 1394 | 8 | PWR 1394 |
| | | 10 | ZY |

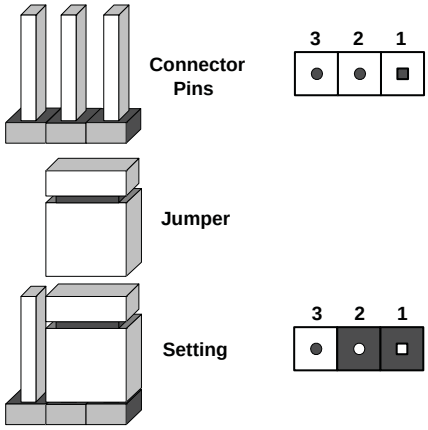
**1394_2 Pin Definitions**

| Pin # | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | PTPAO+ | 2 | PTPAO- |
| 3 | GND | 4 | GND |
| 5 | PTPB1+ | 6 | PTPB1- |
| 7 | PWR 1394 | 8 | PWR 1394 |
| | | 10 | ZY |

### JS_IBTN1 Connection

This connector allows you to install the optional AOC-IMRRAKEY-2008-LSI add-on card to the serverboard. This add-on card allows you to use RAID 5 for your system RAID with LSI 2008 controller.

## 2-8 Jumper Settings




### Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram at right for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

**Note:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

JBT1 contact pads

### CMOS Clear

JBT1 is used to clear CMOS, which will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

***To Clear CMOS***

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

**Note:** *Do not use the PW_ON connector to clear CMOS*.

### I2C to PCI-Express Slot

JI²C1/JI²C2 allows you to enable the I²C bus to communicate with the PCI-Express slot. For the jumpers to work properly, please set both jumpers to the same setting. If enabled, both jumpers must be enabled. If disabled, both jumpers must be disabled. See the table on the right for jumper settings.

**I²C to PCI-Express Slot Jumper Settings (JPI²C1/JPI²C2)**

| Jumper Setting | Definition |
|---|---|
| Closed | Enabled |
| Open | Disabled |

### Watch Dog Enable/Disable

JWD enables the Watch Dog function, a system monitor that takes action when a software application freezes the system. Jumping pins 1-2 will have WD reboot the system if a program freezes. Jumping pins 2-3 will generate a non-maskable interrupt for the program that has frozen. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

**Watch Dog Jumper Settings (JWD)**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Reset |
| Pins 2-3 | NMI |
| Open | Disabled |

**Note:** when Watch Dog is enabled, the user must write their own application software to disable the Watch Dog Timer.

### TPM Support Enable

JPT1 allows the user to enable TPM (Trusted Platform Modules) support to enhance data integrity and system security. See the table on the right for jumper settings. The default setting is enabled.

**TPM Enable/Disable Jumper Settings (JPG1)**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

**VGA Enable/Disable Jumper Settings (JPG1)**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### SAS Enable/Disable

JPS1 allows you to enable or disable the SAS controller. The default position is on pins 1 and 2 to enable SAS. See the table on the right for jumper settings.

**SAS Enable/Disable Jumper Settings (JPS1)**

| Jumper Setting | Definition |
|---|---|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### LAN Enable/Disable

Change the setting of jumper JPL to enable or disable the LAN Ethernet ports. See the table on the right for jumper settings. The default setting is enabled.

| LAN Jumper Settings (JPL) | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

### Compact Flash Master/Slave Select

A Compact Flash Master (Primary)/Slave (Secondary) Select Jumper is located at JCF1. Close this jumper to enable Compact Flash Card. For the Compact Flash Card or the Compact Flash Jumper (JCF1) to work properly, you will need to connect the Compact Flash Card power cable to JWF1 first. Refer to the board layout below for the location.

| Compact Flash Card Master/ Slave Select (JCF1) | |
|---|---|
| Jumper Setting | Definition |
| Open | Slave (Secondary) |
| Closed | Master (Primary) |

### Audio Mode Select

Jumper JL2 allows you to select the Audio mode. You can choose using AC '97 Audio or HD (High-definition) Audio. The default setting is Open to use HD Audio. See the table on the right for jumper settings.

| Audio Mode Select Jumper Settings | |
|---|---|
| Jumper Setting | Definition |
| Closed | AC'97 Panel |
| Open | HD Audio (Default) |

### IEEE 1394 Firewire Enable/Disable

Jumper JPI1 allows you to enable or disable the IEEE 1394 Firewire ports. See the table on the right for jumper settings. The default setting is enabled.

| IEEE 1394 Firewire Jumper Settings (JPI1) | |
|---|---|
| Jumper Setting | Definition |
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

## 2-9 Onboard Indicators

### LAN1/LAN2 LEDs

The Ethernet ports (located beside the VGA port) have two LEDs. On each Gb LAN port, one LED blinks to indicate activity while the other may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

| LAN LED (Connection Speed Indicator) | |
|---|---|
| LED Color | Definition |
| Off | 10 MHz |
| Green | 100 MHz |
| Amber | 1 GHz |

### Dedicated IPMI LAN LEDs

A dedicated IPMI LAN is also included on the H8DA6+/I+(-F). The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the table at right for more information.

| IPMI LAN Link LED (Left) & Activity LED (Right) | | |
|---|---|---|
| Color | Status | Definition |
| Link (Left) | Green: Solid | 100 Mb/s |
| Activity (Right) | Amber: Blinking | Active |

### BMC Heartbeat LED

A BMC (Baseboard Management Control) Heartbeat LED is located at DP5 on the motherboard. When DP5 is on, the BMC Controller functions normally. See the tables at right for more information.

| BMC Heartbeat (DP5)) LED Settings | | |
|---|---|---|
| Color | Status | Definition |
| Green | Blinking | BMC: Normal |
| Off | Off | Not functioning normally |

### Power LED

The DP4 Power LED is located near FAN4. When this LED is lit, it means power is present on the serverboard. Be sure to turn off the system and unplug the power cord(s) before removing or installing components.

| Power LED (DP4) | |
|---|---|
| State | System Status |
| On | Standby power present on serverboard |
| Off | No power connected |

### SAS2008 Heartbeat LED

The LEDS2 SAS2008 Heartbeat LED shows SAS2 activity on the serverboard. See the

| SAS2008 Heartbeat LED (LEDS2) | |
|---|---|
| State | System Status |
| Blinking | SAS Controller is Active |
| Off | SAS Connector Inactive |

## 2-10 Floppy, IDE, SAS and SATA Drive Connections

Use the following information to connect the IDE hard disk drive cables.

- A red mark on a wire typically designates the location of pin 1.

- The 80-wire ATA100/66 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this new technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

### IDE Connectors

There are two IDE connectors (one blue and one white) on the serverboard. IDE#1 (blue) is designated as the Primary IDE drive. The white connector is designated as the Secondary IDE drive and is reserved for Compact Flash Card use only. (See the note below.) See the table on the right for pin definitions.

**Note**: The white slot is reserved for Compact Flash Cards only. Do not use it for other devices. If populated with a Compact Flash Card, IDE#1 (the blue slot) will be available for one device only. For the Compact Flash Card to work properly, you will first need to enable with JCF1 and connect a power cable to JWF1.

**IDE Drive Connector Pin Definitions (IDE#1)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | Reset IDE | 2 | Ground |
| 3 | Host Data 7 | 4 | Host Data 8 |
| 5 | Host Data 6 | 6 | Host Data 9 |
| 7 | Host Data 5 | 8 | Host Data 10 |
| 9 | Host Data 4 | 10 | Host Data 11 |
| 11 | Host Data 3 | 12 | Host Data 12 |
| 13 | Host Data 2 | 14 | Host Data 13 |
| 15 | Host Data 1 | 16 | Host Data 14 |
| 17 | Host Data 0 | 18 | Host Data 15 |
| 19 | Ground | 20 | Key |
| 21 | DRQ3 | 22 | Ground |
| 23 | I/O Write | 24 | Ground |
| 25 | I/O Read | 26 | Ground |
| 27 | IOCHRDY | 28 | BALE |
| 29 | DACK3 | 30 | Ground |
| 31 | IRQ14 | 32 | IOCS16 |
| 33 | Addr1 | 34 | Ground |
| 35 | Addr0 | 36 | Addr2 |
| 37 | Chip Select 0 | 38 | Chip Select 1 |
| 39 | Activity | 40 | Ground |

### SATA Ports

There are no jumpers to configure the SATA ports, which are designated SATA0 through SATA5. See the table on the right for pin definitions.

**SATA Ports Pin Definitions (SATA0-SATA3)**

| Pin # | Definition |
|---|---|
| 1 | Ground |
| 2 | TXP |
| 3 | TXN |
| 4 | Ground |
| 5 | RXN |
| 6 | RXP |
| 7 | Ground |

### SAS Ports

There are eight SAS ports included on the motherboard. See the table on the right for pin definitions.

**Note:** JPS1 must be set correctly to enable the SAS controller.

**SAS Ports Pin Definitions (SAS0 ~ SAS7)**

| Pin# | Definition | Pin # | Definition |
|---|---|---|---|
| 1 | Ground | 2 | TXP |
| 3 | TXN | 4 | Ground |
| 5 | RXN | 6 | RXP |
| 7 | Ground | | |

## 2-11 Enabling SATA RAID

Now that the hardware is set up, you must install the operating system and the SATA RAID drivers, if you wish to use RAID with your SATA drives. The installation procedure differs depending on whether you wish to have the operating system installed on a RAID array or on a separate non-RAID drive. See the instructions below for details.

### Serial ATA (SATA)

Serial ATA (SATA) is a physical storage interface that employs a single cable with a minimum of four wires to create a point-to-point connection between devices. This connection is a serial link that supports a SATA transfer rate from 150 MBps. The serial cables used in SATA are thinner than the traditional cables used in Parallel ATA (PATA) and can extend up to one meter in length, compared to only 40 cm for PATA cables. Overall, SATA provides better functionality than PATA.

## Installing the OS/SATA Driver

Before installing the OS (operating system) and SATA RAID driver, you must decide if you wish to have the operating system installed as part of a bootable RAID array or installed to a separate non-RAID hard drive. If on a separate drive, you may install the driver either during or after the OS installation. If you wish to have the OS on a SATA RAID array, you must follow the procedure below and install the driver during the OS installation.

### *Building a Driver Diskette*

You must first build a driver diskette from the Supermicro CD-ROM that was included with the system. (You will have to create this disk on a computer that is already running and with the OS installed.)

***Building a Driver Diskette***

1. Insert the CD into your CD-ROM drive and start the system. A display as shown in Figure 2-6 will appear.

2. Click on the icon labeled "Build Driver Diskettes and Manuals" and follow the instructions to create a floppy disk with the driver on it.

3. Once it's been created, remove the floppy and insert the installation CD for the Windows Operating System you wish to install into the CD-ROM drive of the new system you are about to configure.

**Note:** You need to have an external USB floppy when building the driver diskette. Window's Vista, Windows 2008 or later Windows OS systems can use a USB stick instead of a floppy.

## Enabling SATA RAID in the BIOS

Before installing the Windows Operating System, you must change some of the BIOS settings.

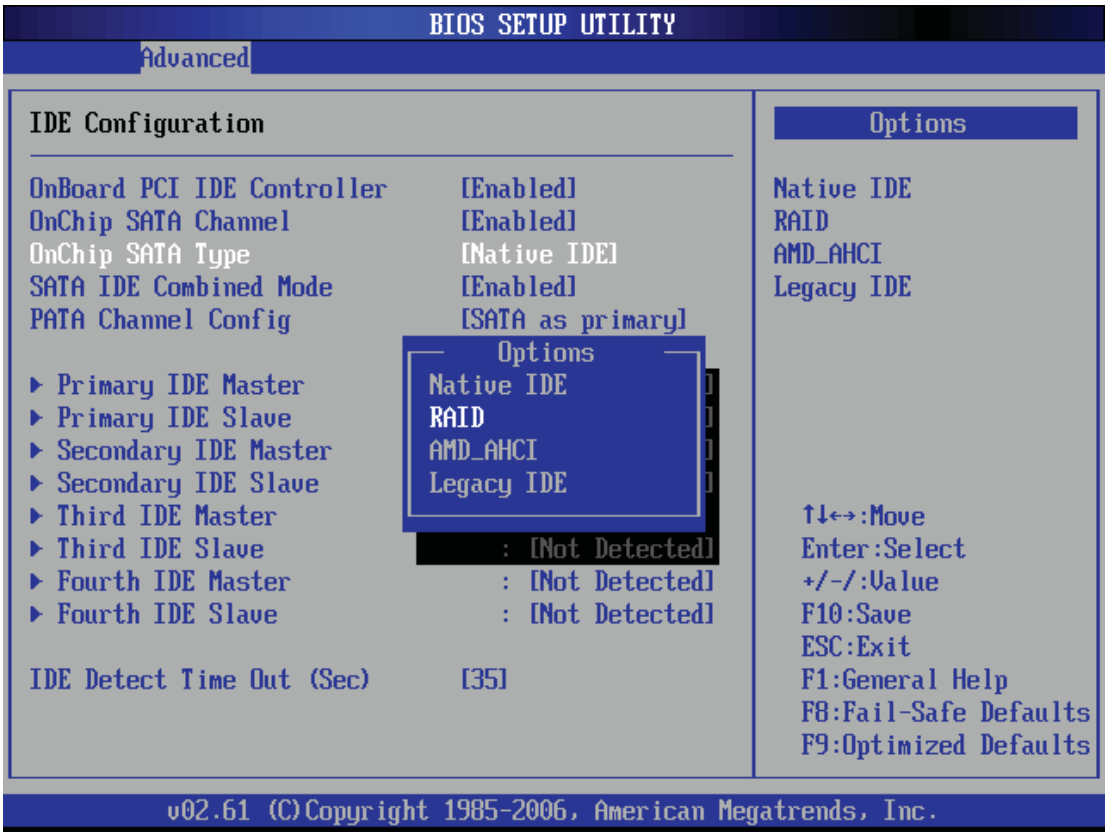
***Changing BIOS SATA RAID Settings***

1. Boot up the system and hit the <Del> key to enter the BIOS Setup Utlility. After the Setup Utility loads,

2. Use the arrow keys to move to the Exit menu. Scroll down with the arrow keys to the "Load Optimal Defaults setting and press <Enter>. Select "OK" to confirm, then <Enter> to load the default settings.

3. Use the arrow keys to move to the "Advanced" menu, then scroll down to "Advanced Chipset Control" and enter "SourthBridge Configuration" and press the <Enter> key. Once in the submenu, scroll down to "OnChip SATA Type" and choose the "RAID" option (see Figure 2-4).

**Figure 2-4. BIOS Setup Screen**



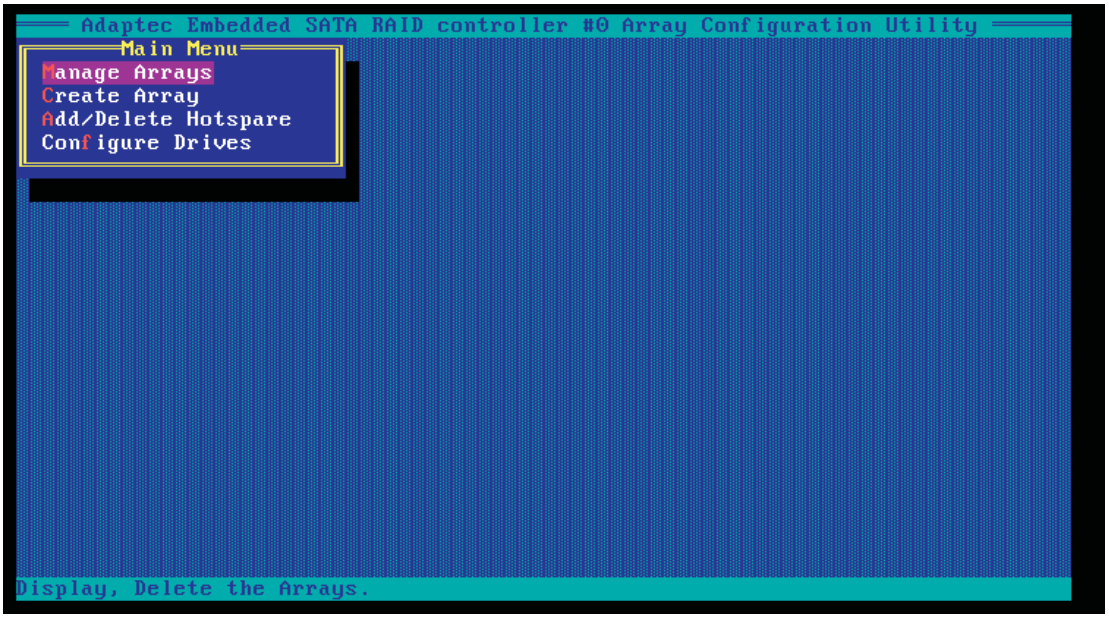

4. Hit the <Esc> key twice and scroll to the Exit menu. Select "Save Changes and Exit" and hit <enter>, then hit <Enter> again to verify.

5. After exiting the BIOS Setup Utility, the system will reboot. When prompted during the startup, press the <CTRL+A> key when prompted to run the Adaptec RAID Utility program (see Figure 2-5).

## Using the Adaptec RAID Utility

The Adaptec® RAID Utility program is where you can define the drives you want to include in the RAID array and the mode and type of RAID.

**Figure 2-5. Adaptec RAID Utility Program Screen**




## Installing the RAID Driver During OS Installation

You may also use the procedure below to install the RAID driver during the Window's OS installation:

1. With the Windows OS installation CD in the CD-ROM drive, restart the system.

2. When you see the prompt, hit the <F6> key to enter Windows setup.

3. Eventually a blue screen will appear with a message that begins "Windows could not determine the type of one or more storage devices . . ." When you see the screen, hit the <S> key to "Specify Additional Device", then insert the driver diskette you just created into the floppy drive.

4. Highlight "Manufuacturer Supplied Hardware Support Disk" and hit the <Enter> key.

5. Highlight the first "Adaptec RAID" driver shown and press the <Enter> key to install it.

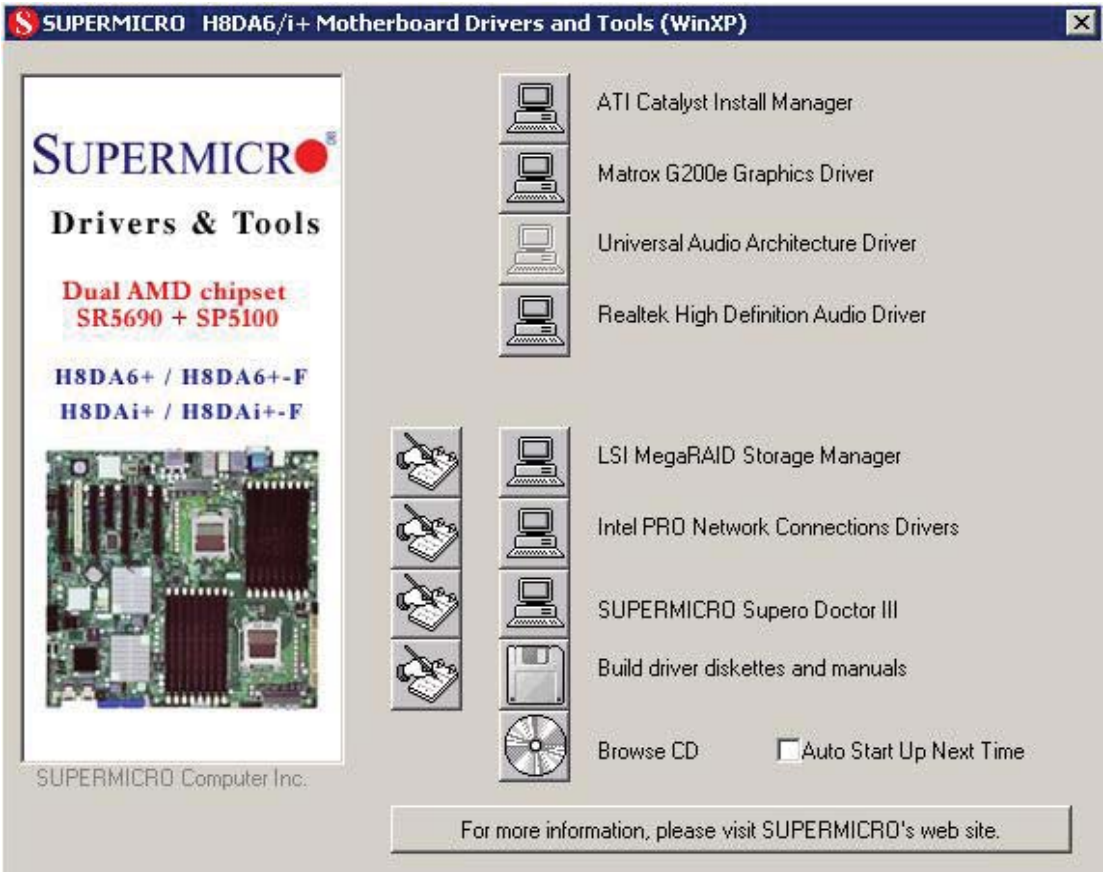
6. Press <Enter> again to continue with the Windows setup.

## 2-12 Installing Drivers

The CD that came bundled with the system contains drivers, some of which must be installed, such as the chipset driver. After inserting this CD into your CD-ROM drive, the display shown in Figure 2-6 should appear. (If this display does not appear, click on the My Computer icon and then on the icon representing your CD-ROM drive. Finally, double click on the S "Setup" icon.)

Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. After installing each item, you should reboot the system before moving on to the next item on the list. The bottom icon with a CD on it allows you to view the entire contents of the CD.

**Figure 2-6. Driver/Tool Installation Display Screen**


SUPERMICRO H8DA6/i+ Motherboard Drivers and Tools (WinXP)
SUPERMICRO
Drivers & Tools
Dual AMD chipset
SR5690 + SP5100
H8DA6+ / H8DA6+-F
H8DAi+ / H8DAi+-F
SUPERMICRO Computer Inc.
ATI Catalyst Install Manager
Matrox G200e Graphics Driver
Universal Audio Architecture Driver
Realtek High Definition Audio Driver
LSI MegaRAID Storage Manager
Intel PRO Network Connections Drivers
SUPERMICRO Supero Doctor III
Build driver diskettes and manuals
Browse CD
Auto Start Up Next Time
For more information, please visit SUPERMICRO's web site.

## Supero Doctor III

The Supero Doctor III program is a Web base management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CD-ROM that came with your motherboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

**Note:** The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

**Note:** When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

**Figure 2-7. Supero Doctor III Interface Display Screen (Health Information)**

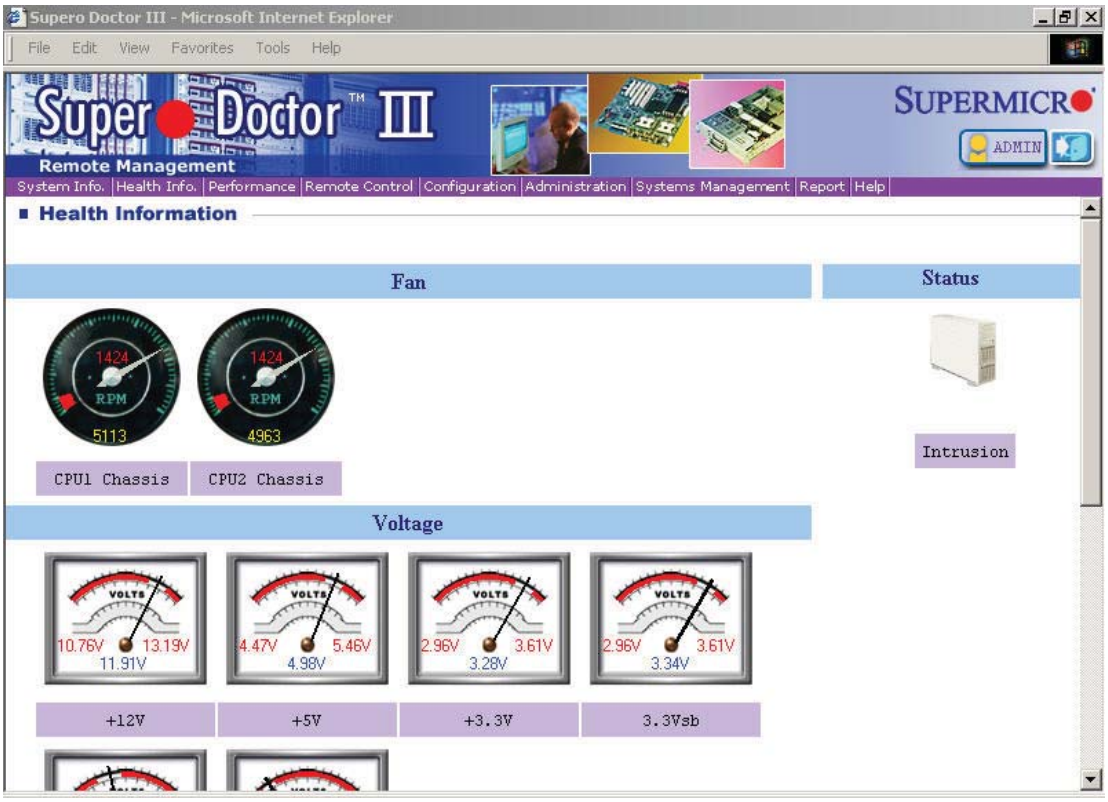


**Figure 2-8. Supero Doctor III Interface Display Screen (Remote Control)**

Supero Doctor III - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Super Doctor III
Remote Management
SUPERMICRO
ADMIN
System Info. Health Info. Performance Remote Control Configuration Administration Systems Management Report Help
Remote Control
Graceful Power Control
Open Console
Power Control
Enter
Comm.
Graceful power control
Supero Doctor III allows a user to inform the OS to reboot or shut down within a specified time (the default is 30 seconds). Before the system reboots or shuts down, it's allowed to cancel the action.
Requirements
Keep Supero SD3Service Daemon running at all times on this system.
Provide TCP/IP connectivity.
Power control

**Note:** Super Doctor III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download the Super Doctor III User's Guide at: <http://www.supermicro.com/PRODUCT/Manuals/SDIII/UserGuide.pdf>. For Linux, we recommend that you use the Supero Doctor II applictation instead.

# Chapter 3

# Troubleshooting

## 3-1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/or 'Returning Merchandise for Service' section(s) in this chapter. Always disconnect the AC power cord before adding, changing or installing any hardware components.

### Before Power On

1. Check that the onboard power LED is lit (DP4 on the motherboard).
2. Make sure that the power connector is connected to your power supply.
3. Make sure that no short circuits exist between the motherboard and chassis.
4. Disconnect all cables from the motherboard, including those for the keyboard and mouse.
5. Remove all add-on cards.
6. Install a CPU and heatsink (making sure it is fully seated) and connect the internal (chassis) speaker and the power LED to the motherboard. Check all jumper settings as well.
7. Use the correct type of onboard CMOS battery as recommended by the manufacturer. To avoid possible explosion, do not install the CMOS battery upside down.

### No Power

1. Make sure that no short circuits exist between the motherboard and the chassis.
2. Verify that all jumpers are set to their default positions.
3. Check that the 115V/230V switch on the power supply is properly set.

4. Turn the power switch on and off to test the system.

5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

## No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.

2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes.

**Note:** If you are a system integrator, VAR or OEM, a POST diagnostics card is recommended. For I/O port 80h codes, refer to Appendix B.

## Memory Errors

1. Make sure that the DIMM modules are properly and fully installed.

2. You should be using registered ECC DDR-2 memory (see next page). Also, it is recommended that you use the same memory type and speed for all DIMMs in the system. See Section 2-4 for memory details.

3. Check for bad DIMM modules or slots by swapping modules between slots and noting the results.

4. Check the power supply voltage 115V/230V switch.

## Losing the System's Setup Configuration

1. Make sure that you are using a high quality power supply. A poor quality power supply may cause the system to lose the CMOS setup information. Refer to Section 1-6 for details on recommended power supplies.

2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

## 3-2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, note that as a motherboard manufacturer, we do not sell directly to end-users, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please review the 'Troubleshooting Procedures' and 'Frequently Asked Questions' (FAQs) sections in this chapter or see the FAQs on our web site before contacting Technical Support.

2. BIOS upgrades can be downloaded from our web site. **Note:** Not all BIOS can be flashed depending on the modifications to the boot block code.

3. If you still cannot resolve the problem, include the following information when contacting us for technical support:

   - Motherboard model and PCB revision number
   - BIOS release date/version (this can be seen on the initial display when your system first boots up)
   - System configuration

An example of a Technical Support form is posted on our web site.

Distributors: For immediate assistance, please have your account number ready when contacting our technical support department by e-mail.

## 3-3 Frequently Asked Questions

**Question: What type of memory does my motherboard support?**

**Answer:** The H8DA6+/I+(-F) supports up to 128 GB of DDR2-800/667/533/400 registered ECC SDRAM (or 64 GB with a single CPU installed). Both single and dual channel configuratiosn are supported. See Section 2-4 for details on installing memory and refer to the Supermicro website for tested memory as a reference.

**Question: How do I update my BIOS?**

**Answer:** It is recommended that you **not** upgrade your BIOS if you are not experiencing problems with your system. Updated BIOS files are located on our web site. Please check our BIOS warning message and the information on how to update your BIOS on our web site. Also, check the current BIOS revision and make sure it is newer than your current BIOS before downloading.

Select your motherboard model on the web page and download the corresponding BIOS file to your computer. Unzip the BIOS update file, in which you will find the readme.txt (flash instructions), the afudos.exe (BIOS flash utility) and the BIOS image (xxx.rom) files. Copy these files to a bootable floppy disk, insert the disk into drive A and reboot the system. At the DOS prompt after rebooting, enter the command "flash" (without quotation marks) then type in the BIOS file that you want to update with (xxxx.rom).

**Question: What's on the CD that came with my motherboard?**

**Answer:** The supplied compact disc has quite a few drivers and programs that will greatly enhance your system. We recommend that you review the CD and install the applications you need. Applications on the CD include chipset drivers for Windows and security and audio drivers.

**Question: Why can't I turn off the power using the momentary power on/off switch?**

**Answer:** The instant power off function is controlled in BIOS by the Power Button Mode setting. When the On/Off feature is enabled, the motherboard will have instant off capabilities as long as the BIOS has control of the system. When the Standby or Suspend feature is enabled or when the BIOS is not in control such as during memory count (the first screen that appears when the system is turned on), the momentary on/off switch must be held for more than four seconds to shut down the system. This feature is required to implement the ACPI features on the motherboard.

## 3-4 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

For faster service, RMA authorizations may be requested online (http://www.supermicro.com/support/rma/).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alteration, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

# Chapter 4

# BIOS

## 4-1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the H8DA6+/I+(-F) serverboard. The AMI ROM BIOS is stored in a flash chip and can be easily upgraded using a floppy disk-based program.

**Note:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of our web site for any changes to BIOS that may not be reflected in this manual.

### Starting the Setup Utility

To enter the BIOS Setup Utility, hit the <Delete> key while the system is booting-up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.) Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.

A "▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

## 4-2 Main Menu

When you first enter AMI BIOS Setup Utility, you will see the Main Menu screen. You can always return to the Main Menu by selecting the ***Main*** tab on the top of the screen with the arrow keys.

The Main Menu screen provides you with a system overview, which includes the version, built date and ID of the AMIBIOS, the type, speed and number of the processors in the system and the amount of memory installed in the system.

**System Time/System Date**

You can edit this field to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in DAY/MM/DD/YYYY format. The time is entered in HH:MM:SS format. Please note that time is in a 24-hour format. For example, 5:30 A.M. appears as 05:30:00 and 5:30 P.M. as 17:30:00.

## 4-3 Advanced Settings Menu

### ▶ Boot Features

**Quick Boot**

If Enabled, this option will skip certain tests during POST to reduce the time needed for the system to boot up. The options are **Enabled** and Disabled.

**Quiet Boot**

If Disabled, normal POST messages will be displayed on boot-up. If **Enabled**, this display the OEM logo instead of POST messages.

**Add On ROM Display Mode**

This option sets the display mode for Option ROM. The options are **Force BIOS** or Keep Current.

**Bootup Num Lock**

This option selects the power-on state for the NUM lock to either **On** or Off.

**PS/2 Mouse Support**

Use this option to select support for the PS/2 mouse. Options are Disabled, Enabled or **Auto**.

**Wait for F1 if Error**

This setting controls the system response when an error is detected during the boot sequence. When enabled, BIOS will stop the boot sequence when an error is detected, at which point you will need to press the F1 button to re-enter the BIOS setup menu. The options are **Enabled** and Disabled.

**Hit 'DEL' Message Display**

Use this option to **Enable** or Disable the "Press DEL to run setup" message in POST.

**Watch Dog Function**

This option allows the system to restart when it is not active more than 5 minutes. Options are Enabled or **Disabled**.

**Power Mode Button**

This option selects the Power Button functionality. Options are **Instant Off** or 4-seconds Override.

**Restore on AC Power Loss**

This setting allows you to choose how the system will react when power returns after an unexpected loss of power. The options are Power Off, Power On and **Last State**.

**Interrupt 19 Capture**

Select Enabled to allow ROMs to trap Interrupt 19. The options are **Enabled** and Disabled.

## ▶ Processor and Clock Options

**CPU Configuration**

This displays static information on the Module Version, AGESA Version, Physical Count and Logical Count for the system's processor(s) and clock.

**CPU Information**

This setting is used to select which physical CPU's information to display. Options include **Processor 0** or Processor 1. The information for the selected processor includes Processor number, Revision, Cache L1/L2/L3, Speed, NB CLK, Able to Change Frequency and uCode Patch Level.

**Note:** Zero is always the "Boot Strap Processor" or main CPU with all others being "Application Processors".

**GART Error Reporting**

This option should remain disabled for normal operation. The driver developer may enable this option for testing purposes. Options are Enabled or **Disabled**.

**Microcode Update**

This setting **Enables** or Disables microcode updating.

**Secure Virtual Machine Mode**

This setting is used to **Enable** or Disable SVM.

**Power Now**

This setting is used to **Enable** or Disable the AMD Power Now feature.

**Power Cap**

This setting is used to describe and set the highest performance P-state in the operating system. Options include **P-state 0**, P-state 1, P-state 3 and P-state 4.

**ACPI SRAT Table**

This option **Enables** or Disables the building of the ACPI SRAT Table.

**CPU Prefetching**

Use this setting to **Enable** or Disable CPU prefetching.

**IO Prefetching**

Use this setting to **Enable** or Disable IO prefetching.

**Probe Filter**

Use this setting to enable the Probe Filter. Options include **Auto** or Disabled.

**Clock Spread Spectrum**

Use this setting to Enable or **Disable** Clock Spread Spectrum.

## ▶ Advanced Chipset Control

### ▶ NorthBridge Configuration

#### ▶ Memory Configuration

**Bank Interleaving**

Select Auto to automatically enable a bank-interleaving memory scheme when this function is supported by the processor. The options are Auto and **Disabled**.

**Node Interleaving**

Use this setting to enable the Node interleaving memory scheme when this function is supported by the processor. The options are Enabled or **Disabled**.

**Channel Interleaving**

Selects the channel-interleaving memory scheme when this function is supported by the processor. The options are Disabled, Address Bits 6, Address Bits 12, **XOR of Address Bits [20:16, 6]** and XOR of Address Bits [20:16, 9].

**MemClk Tristate C3/ALTVID**

Use this setting to Enable or **Disable** memory clock tristate during C3 and ALT VID.

**Memory Hole Remapping**

When "Enabled", this feature enables hardware memory remapping around the memory hole. Options are **Enabled** and Disabled.

**CS Sparing Enable**

This setting will reserve a spare memory rank in each node when enabled. Options are Enable and **Disable**.

**DCT Unganged Mode**

This setting enables unganged DRAM mode (64-bit). Options are Auto (ganged mode) and **Always** (unganged mode).

**Power Down Enable**

This setting enables or disables DDR power down mode. Options are **Enabled** and Disabled.

**Power Down Mode**

This sets the power down mode. Options are **Channel** and Chip Select.

## ▶ ECC Configuration

**ECC Mode**

This submenu affects the DRAM scrub rate based on its setting. Options include Disabled, **Basic**, Good, Super, Max and User. Selecting User activates the other options for user setting.

**DRAM ECC Enable**

This setting allows hardware to report and correct memory errors automatically, maintaining system integrity. Options are **Enabled** or Disabled.

**DRAM Scrub Redirect**

This setting allows the system to correct DRAM ECC errors immediately when they occur, even if background scrubbing is off. Options are Enabled or **Disabled**.

**4-Bit ECC Mode**

Allows the user to enabled 4-bit ECC mode (also known as ECC Chipkill). Options are **Enabled** and Disabled.

**DRAM BG Scrub**

Corrects memory errors so later reads are correct. Options are Disabled and various times in nanoseconds and microseconds. The default is **Disabled**.

**Data Cache BG Scrub**

Allows L1 cache RAM to be corrected when idle. Options are Disabled and various times in nanoseconds and microseconds. The default is **Disabled**.

#### L2 Cache BG Scrub

Allows L2 cache RAM to be corrected when idle. Options are Disabled and various times in nanoseconds and microseconds. The default is **Disabled**.

#### L3 Cache BG Scrub

Allows L3 cache RAM to be corrected when idle. Options are Disabled and various times in nanoseconds and microseconds. The default is **Disabled**.

### ▶ DRAM Timing Configuration

#### Memory Clock Mode

This setting specifies the memory clock mode. Options are **Auto**, Limit and Manual.

#### DRAM Timing Mode

This setting specifies the DRAM timing mode. Options are **Auto** and DCT0, DCT1 and Both.

#### Alternate VID

Specify the alternate VID while in low power states. Options are **Auto** and various voltages from .800V to 1.050V in increments of .025V.

#### Memory Timing Parameters

This setting selects which nodes timing parameters to display (**CPU Node 0** or CPU Node 1).

## ▶ Hyper Transport Configuration

#### NODE0: PCI-X2 HT Link

#### Link Speed

The Hyper Transport link will run at this speed if it is slower than or equal to the system clock speed. Options include 1 GHz and **Auto**.

#### Link Width

Hyper Transport runs at this width. Options include **Auto**, 4 Bit, 8 Bit and 16 Bit.

### NODE0: NODE1 HT Link Speed

#### Link Speed

The Hyper Transport link will run at this speed if it is slower than or equal to the system clock speed and what the board is capable. Options include 1 GHz and **Auto**.

### NODE0: NODE1 HT Link Width

#### Link Width

Hyper Transport runs at this width. Options include **Auto**, 4 Bit, 8 Bit and 16 Bit.

### IOMMU

This setting is used to disable or set the GART size in systems without AGP. Options include AGP Present, **Disabled**, 32 MB, 64 MB, 128 MB, 256 MB, 512 MB and 1 GB.

### HD Audio Azalia Device

This setting allows you to enable or disable your HD Audio Azalia device. Options include Enabled, Disabled and **Auto**.

### Frontside Audio Mode

Use this setting to set the frontside audio mode. The default is **HD Audio**.

### OHCI/EHCI HC Device Functions

These settings allow you to either **Enable** or Disable functions for OHCI or EHCI bus devices.

### USB 2.0 Controller

This setting allows you to **Enable** or Disable the USB 2.0 Controller.

### Legacy USB Support

Select "Enabled" to enable the support for USB Legacy devices. Disable Legacy support if there are no USB devices installed in the system. "Auto" disables Legacy support if no USB devices are connected. The options are Disabled, Enabled and **Auto**.

## ▶ IDE Configuration

### Onboard PCI IDE Controller

This setting allows you to **Enable** or Disable the PCI IDE controller.

### On Chip SATA Channel

This setting allows you to **Enable** or Disable the OnChip SATA channel.

### On Chip SATA Type

Use this setting to set the On Chip SATA type. Options include **Native IDE**, RAID, AHCI and Legacy IDE.

### SATA IDE Combined Mode

This setting allows you to **Enable** or Disable the SATA IDE combined mode.

### PATA Channel Configuration

This allows you to set PATA channel configuration. Options include **SATA as Primary** or SATA as secondary.

## ▶ Primary/Secondary/Third/Fourth IDE Master/Slave

### Type

This selects the type of device connected to the system. Options include **Auto**, CD/DVD, Not Installed and ARMD

### LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. The options are Disabled and **Auto**.

### Block (Multi-Sector Transfer)

Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt. Select "Disabled" to allow the data to be transferred from and to the device one sector at a time. Select "Auto" to allows the data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

**PIO Mode**

PIO (Programmable I/O) mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4. Select Auto to allow BIOS to auto detect the PIO mode. Use this value if the IDE disk drive support cannot be determined. Select 0 to allow BIOS to use PIO mode 0, which has a data transfer rate of 3.3 MBs. Select 1 to allow BIOS to use PIO mode 1, which has a data transfer rate of 5.2 MBs. Select 2 to allow BIOS to use PIO mode 2, which has a data transfer rate of 8.3 MBs. Select 3 to allow BIOS to use PIO mode 3, which has a data transfer rate of 11.1 MBs. Select 4 to allow BIOS to use PIO mode 4, which has a data transfer rate of 16.6 MBs. This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.

**DMA Mode**

Selects the DMA Mode. Options are **Auto**, SWDMA0, SWDMA1, SWDMA2, MWDMA0. MDWDMA1, MWDMA2, UDMA0. UDMA1, UDMA2, UDMA3, UDMA4 and UDMA5. (SWDMA=Single Word DMA, MWDMA=Multi Word DMA, UDMA=UltraDMA.)

**S.M.A.R.T.**

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select "Auto" to allow BIOS to auto detect hard disk drive support. Select "Disabled" to prevent AMI BIOS from using the S.M.A.R.T. Select "Enabled" to allow AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and **Auto**.

**32-Bit Data Transfer**

Select "Enabled" to activate the function of 32-Bit data transfer. Select "Disabled" to deactivate the function. The options are **Enabled** and Disabled.

**IDE Detect Timeout (Sec)**

Use the +/- keys to adjust and select the time out for detecting ATA/ATAPI devices. The default value is **35**.

## ▶ PCI/PnP Configuration

### Clear NVRAM

Select Yes to clear NVRAM during boot-up. The options are Yes and **No**.

### Plug & Play O/S

Select Yes to allow the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select **No** to allow AMIBIOS to configure all devices in the system.

### PCI Latency Timer

This option sets the latency of all PCI devices on the PCI bus. Select a value to set the PCI latency in PCI clock cycles. Options are 32, **64**, 96, 128, 160, 192, 224 and 248.

### PCI IDE Busmaster

Use this setting to **Enable** or Disable BIOS enabled uses of PCI Busmastering for reading or writing to IDE drives.

### ROM Scan Ordering

This setting determines which kind of option ROM activates before another. Options are **Onboard First** or Add On First

### PCI Slot 1 ~ 7 Optrom

Use these settings to **Enable** or Disable the OPROM (Option ROM firmware) for slot 1 through 7.

### Onboard LAN Option ROM Select

This setting allows you to select iSCSI support instead of PCI-Express support for Intel 82576 or 82574L communication chips. Options are **PXE** or iSCSI.

### Load Onboard LAN 1/2 Option ROM

Use these settings to Enable or **Disable** the onboard option ROM for LAN 1 or 2. This setting must be enabled for each LAN port to view the Boot Menu settings for it.

### Load Onboard SAS Option ROM

Use this setting to **Enable** or Disable the onboard SAS option ROM.

### Boots Graphic Adapter Priority

This setting allows you to select the boot priority for your graphics adapters in your system. Options include **Onboard VGA**, Slot 6 or Other.

## ▶ Remote Access Configuration

### Remote Access

Use this option to **Enable** or Disable Remote Access in your system. If enabled, the settings below will appear.

### Serial Port Number

Use this setting to select the serial port for console redirection. Options include COM1, COM2 or **COM3***. The displayed base address and IRQ for the serial port changes to reflect the selection you make.

**Note:** Make sure the selected port is enabled.

### Serial Port Mode

Selects the serial port settings to use. Options are **(115200 8, n, 1)**, (57600 8, n, 1), (38400 8, n, 1), (19200 8, n, 1) and (09600 8, n, 1).

### Flow Control

Selects the flow control to be used for console redirection. Options are **None,** Hardware and Software.

### Redirection After BIOS POST

Options are Disable (no redirection after BIOS POST), Boot Loader (redirection during POST and during boot loader) and **Always** (redirection always active). Note that some OS's may not work with this set to Always.

### Terminal Type

Selects the type of the target terminal. Options are **ANSI**, VT100 and VT-UTF8.

### VT-UTF8 Combo Key Support

Allows you to **Enable** or Disable VT-UTF8 combination key support for ANSI/ VT100 terminals.

### Sredir Memory Display Delay

Use this setting to set the delay in seconds to display memory information. Options are **No Delay**, 1 sec, 2 secs and 4 secs.

## ▶ Hardware Health Configuration

### CPU Overheat Alarm

Use the "+" and "-" keys to set the CPU temperature threshold to between 65° and 90° C. When this threshold is exceeded, the overheat LED on the chassis will light up and an alarm will sound. The LED and alarm will turn off once the CPU temperature has dropped to 5 degrees below the threshold set. The default setting is **72° C**.

### Fan Speed Control Modes

This feature allows the user to determine how the system will control the speed of the onboard fans. Select "Workstation" if your system is used as a Workstation. Select "Server" if your system is used as a Server. Select "Disable" to disable the fan speed control function to allow the onboard fans to continuously run at full speed (12V). The options are Full Speed (FS), Performance (PF), Balanced (BL) and **Energy Saving (ES)**.

### FAN1 Speed through FAN8 Reading

The speeds of the onboard fans (in rpm) are displayed here.

Other items in the submenu are systems monitor displays for the following information:

NB 1 Temperature, NB2 Temperature, SAS Temperature, CPU1 VCore, CPU2 VCore, CPU1 Mem VTT, CPU2 Mem VTT, CPU1 Mem, CPU2 Mem, NB1 1.1V, NB2 1.1V, 5V, +12V, -12V, 3.3Vcc, 3.3VSB, VBAT and HT Voltage.

## ▶ ACPI Configuration

### High Performance Event Timer

This setting **Enables** or Disables the high performance event timer.

### PS/2 KB/MS Wakup

This option Enables or **Disables** the keyboard/mouse wakeup for these devices.

### USB Device Wakup

Use this setting to Enable or **Disable** USB device wakup from S3/S4.

### ACPI Aware O/S

This setting enables or disables ACPI support for the operating system. Use Enable (Yes) if the OS supports ACPI. Use Disable (No) if the OS does not support ACPI. Options are **Yes** or No.

**Suspend Mode**

This setting selects the ACPI state used for system suspend. Options include **S1 (POS)**, S3 (STR) and Auto.

**ACPI APIC Support**

Determines whether to include the ACPI APIC table pointer in the RSDT pointer list. The available options are **Enabled** and Disabled.

**Headless Mode**

Use this setting to Enable or **Disable** headless operation mode through ACPI.

**ACPI Version Features**

Use this setting the determine which ACPI version to use. Options are ACPI v1.0, **ACPI v2.0** and ACPI v3.0.

## ▶ Trusted Computing

**TCG/TPM Support**

This setting allows you to enable or disable TPM TCG (TPM 1.1/1.2) support in the BIOS. Optiosn are Yes or **No**.

## ▶ IPMI Configuration

This menu shows static information about the IPMI firmware revision and status of the BMC, as well as options for IPMI configuration.

### ▶ View BMC System Event Log

Pressing the Enter key will open the following settings. Use the "+" and "-" keys to navigate through the system event log.

**Clear BMC System Event Log**

Selecting this and pressing the Enter key will clear the BMC system event log.

### ▶ Set LAN Configuration

Use the "+" and "-" keys to choose the desired channel number.

**Channel Number**

This option sets the channel number for the SEI LAN CONFIG Command to any proper value below 16.

**IP Address Source**

This setting sets the IP address source as either Static or **DHCP**. Selecting Static allows you to manually set the IP Address, Subnet Mask and Gateway Address/

### ▶ IP Address

Push a number key to modify the parameter and enter the IP Address. The IP address and current IP address in the BMC are shown.

### ▶ Subnet Mask

Push a number key to modify the parameter and enter the Subnet Mask Address. The subnet address and current subnet address in the BMC are shown.

### ▶ Gateway Address

Push a number key to modify the parameter and enter the Gateway Address. The Gateway address and current Gateway address in the BMC are shown

### ▶ MAC Address

Push a number key to modify the parameter and enter the MAC Address. The MAC address and current MAC address in the BMC are shown.

**BMC Watch Dog Timer Action**

This setting is used to set the Watch Dog function. The options are **Disabled**, Reset System, Power Down and Power Cycle.

## ▶ Event Log Configuration

**View Event Log**

Highlight this item and press <Enter> to view the contents of the event log.

**Mark All Events as Read**

Highlight this item and press <Enter> to mark all events as read.

**Clear Event Log**

Select Yes and press <Enter> to clear all event logs. The options are Yes and No to verify.

**PCI Express Error Logging**

This setting allows you to Enable or **Disable** PCI Express Advanced Error Logging.

## 4-4 Security Menu

AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

**Change Supervisor Password**

Select this option and press <Enter> to access the sub menu, and then type in the password.

**Change User Password**

Select this option and press <Enter> to access the sub menu, and then type in the password.

**Boot Sector Virus Protection**

This option is near the bottom of the Security Setup screen. Select "Disabled" to deactivate the Boot Sector Virus Protection. Select "Enabled" to enable boot sector protection. When "Enabled", AMI BIOS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

## 4-5 Boot Menu

The Boot Menu is accessible only when the "Load Onboard LAN Option ROM" setting (in the PCI/PnP Configuration menu) is enabled.

### ▶ Boot Device Priority

This feature allows the user to prioritize the boot sequence from the available devices.

### ▶ Hard Disk Drives

This feature allows the user to specify the boot sequence from available hard disk drives.

### ▶ CD/DVD Drives

This feature allows the user to specify the boot sequence from available CD/DVD drives.

## 4-6 Exit Menu

Select the Exit tab from AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.

### Save Changes and Exit

When you have completed the system configuration changes, select this option to leave BIOS Setup and reboot the computer, so the new system configuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

### Discard Changes and Exit

Select this option to quit BIOS Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

### Discard Changes

Select this option and press <Enter> to discard all the changes and return to AMI BIOS Utility Program.

### Load Optimal Defaults

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then Select "OK" to allow BIOS to automatically load the Optimal Defaults as the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

### Load Fail-Safe Defaults

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not maximum performance.

# Notes

# Appendix A

# BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

**Non-fatal errors** are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

**Fatal errors** are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

## A-1 AMIBIOS Error Beep Codes

| Beep Code | Error Message | Description |
|---|---|---|
| 1 beep | Refresh | Circuits have been reset (Ready to power up) |
| 5 short, 1 long | Memory error | No memory detected in system |
| 1 long, 8 short | Video error | Video adapter disabled or missing |

# Notes

# Appendix B

# BIOS POST Checkpoint Codes

When AMIBIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, diagnostic equipment can be attached to the computer to read I/O port 0080h.

## B-1 Uncompressed Initialization Codes

The uncompressed initialization checkpoint codes are listed in order of execution:

| Checkpoint | Code Description |
|---|---|
| D0h | The NMI is disabled. Power on delay is starting. Next, the initialization code checksum will be verified. |
| D1h | Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh and entering 4 GB flat mode next. |
| D3h | Starting memory sizing next. |
| D4h | Returning to real mode. Executing any OEM patches and setting the Stack next. |
| D5h | Passing control to the uncompressed code in shadow RAM at E000:0000h. The initialization code is copied to segment 0 and control will be transferred to segment 0. |
| D6h | Control is in segment 0. Next, checking if <Ctrl> <Home> was pressed and verifying the system BIOS checksum. If either <Ctrl> <Home> was pressed or the system BIOS checksum is bad, next will go to checkpoint code E0h. Otherwise, going to checkpoint code D7h. |

## B-2 Bootblock Recovery Codes

The bootblock recovery checkpoint codes are listed in order of execution:

| Checkpoint | Code Description |
|---|---|
| E0h | The onboard floppy controller if available is initialized. Next, beginning the base 512 KB memory test. |
| E1h | Initializing the interrupt vector table next. |
| E2h | Initializing the DMA and Interrupt controllers next. |
| E6h | Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory. |
| Edh | Initializing the floppy drive. |
| Eeh | Looking for a floppy diskette in drive A:. Reading the first sector of the diskette. |
| Efh | A read error occurred while reading the floppy drive in drive A:. |
| F0h | Next, searching for the AMIBOOT.ROM file in the root directory. |
| F1h | The AMIBOOT.ROM file is not in the root directory. |
| F2h | Next, reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMI-BOOT.ROM file. |
| F3h | Next, reading the AMIBOOT.ROM file, cluster by cluster. |
| F4h | The AMIBOOT.ROM file is not the correct size. |
| F5h | Next, disabling internal cache memory. |
| FBh | Next, detecting the type of flash ROM. |
| FCh | Next, erasing the flash ROM. |
| FDh | Next, programming the flash ROM. |
| FFh | Flash ROM programming was successful. Next, restarting the system BIOS. |

## B-3 Uncompressed Initialization Codes

The following runtime checkpoint codes are listed in order of execution.

These codes are uncompressed in F0000h shadow RAM.

| Checkpoint | Code Description |
|---|---|
| 03h | The NMI is disabled. Next, checking for a soft reset or a power on condition. |
| 05h | The BIOS stack has been built. Next, disabling cache memory. |
| 06h | Uncompressing the POST code next. |
| 07h | Next, initializing the CPU and the CPU data area. |
| 08h | The CMOS checksum calculation is done next. |
| 0Ah | The CMOS checksum calculation is done. Initializing the CMOS status register for date and time next. |
| 0Bh | The CMOS status register is initialized. Next, performing any required initialization before the keyboard BAT command is issued. |
| 0Ch | The keyboard controller input buffer is free. Next, issuing the BAT command to the keyboard controller. |
| 0Eh | The keyboard controller BAT command result has been verified. Next, performing any necessary initialization after the keyboard controller BAT command test. |
| 0Fh | The initialization after the keyboard controller BAT command test is done. The keyboard command byte is written next. |
| 10h | The keyboard controller command byte is written. Next, issuing the Pin 23 and 24 blocking and unblocking command. |
| 11h | Next, checking if <End or <Ins> keys were pressed during power on. Initializing CMOS RAM if the Initialize CMOS RAM in every boot AMIBIOS POST option was set in AMIBCP or the <End> key was pressed. |
| 12h | Next, disabling DMA controllers 1 and 2 and interrupt controllers 1 and 2. |
| 13h | The video display has been disabled. Port B has been initialized. Next, initializing the chipset. |
| 14h | The 8254 timer test will begin next. |
| 19h | Next, programming the flash ROM. |
| 1Ah | The memory refresh line is toggling. Checking the 15 second on/off time next. |
| 2Bh | Passing control to the video ROM to perform any required configuration before the video ROM test. |
| 2Ch | All necessary processing before passing control to the video ROM is done. Looking for the video ROM next and passing control to it. |
| 2Dh | The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control |
| 23h | Reading the 8042 input port and disabling the MEGAKEY Green PC feature next. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors. |
| 24h | The configuration required before interrupt vector initialization has completed. Interrupt vector initialization is about to begin. |
| 25h | Interrupt vector initialization is done. Clearing the password if the POST DIAG switch is on. |
| 27h | Any initialization before setting video mode will be done next. |
| 28h | Initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next. |
| 2Ah | Bus initialization system, static, output devices will be done next, if present. See the last page for additional information. |

| Checkpoint | Code Description |
|---|---|
| 2Eh | Completed post-video ROM test processing. If the EGA/VGA controller is not found, performing the display memory read/write test next. |
| 2Fh | The EGA/VGA controller was not found. The display memory read/write test is about to begin. |
| 30h | The display memory read/write test passed. Look for retrace checking next. |
| 31h | The display memory read/write test or retrace checking failed. Performing the alternate display memory read/write test next. |
| 32h | The alternate display memory read/write test passed. Looking for alternate display retrace checking next. |
| 34h | Video display checking is over. Setting the display mode next. |
| 37h | The display mode is set. Displaying the power on message next. |
| 38h | Initializing the bus input, IPL, general devices next, if present. See the last page of this chapter for additional information. |
| 39h | Displaying bus initialization error messages. See the last page of this chapter for additional information. |
| 3Ah | The new cursor position has been read and saved. Displaying the Hit <DEL> message next. |
| 3Bh | The Hit <DEL> message is displayed. The protected mode memory test is about to start. |
| 40h | Preparing the descriptor tables next. |
| 42h | The descriptor tables are prepared. Entering protected mode for the memory test next. |
| 43h | Entered protected mode. Enabling interrupts for diagnostics mode next. |
| 44h | Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0 next. |
| 45h | Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size next. |
| 46h | The memory wraparound test is done. Memory size calculation has been done. Writing patterns to test memory next. |
| 47h | The memory pattern has been written to extended memory. Writing patterns to the base 640 KB memory next. |
| 48h | Patterns written in base memory. Determining the amount of memory below 1 MB next. |
| 49h | The amount of memory below 1 MB has been found and verified. |
| 4Bh | The amount of memory above 1 MB has been found and verified. Checking for a soft reset and clearing the memory below 1 MB for the soft reset next. If this is a power on situation, going to checkpoint 4Eh next. |
| 4Ch | The memory below 1 MB has been cleared via a soft reset. Clearing the memory above 1 MB next. |
| 4Dh | The memory above 1 MB has been cleared via a soft reset. Saving the memory size next. Going to checkpoint 52h next. |
| 4Eh | The memory test started, but not as the result of a soft reset. Displaying the first 64 KB memory size next. |
| 4Fh | The memory size display has started. The display is updated during the memory test. Performing the sequential and random memory test next. |
| 50h | The memory below 1 MB has been tested and initialized. Adjusting the displayed memory size for relocation and shadowing next. |
| 51h | The memory size display was adjusted for relocation and shadowing. |
| 52h | The memory above 1 MB has been tested and initialized. Saving the memory size information next. |
| 53h | The memory size information and the CPU registers are saved. Entering real mode next. |

| Checkpoint | Code Description |
|---|---|
| 54h | Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI next. |
| 57h | The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing next. |
| 58h | The memory size was adjusted for relocation and shadowing. Clearing the Hit <DEL> message next. |
| 59h | The Hit <DEL> message is cleared. The <WAIT...> message is displayed. Starting the DMA and interrupt controller test next. |
| 60h | The DMA page register test passed. Performing the DMA Controller 1 base register test next. |
| 62h | The DMA controller 1 base register test passed. Performing the DMA controller 2 base register test next. |
| 65h | The DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next. |
| 66h | Completed programming DMA controllers 1 and 2. Initializing the 8259 interrupt controller next. |
| 67h | Completed 8259 interrupt controller initialization. |
| 7Fh | Extended NMI source enabling is in progress. |
| 80h | The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next. |
| 81h | A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next. |
| 82h | The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer next. |
| 83h | The command byte was written and global data initialization has completed. Checking for a locked key next. |
| 84h | Locked key checking is over. Checking for a memory size mismatch with CMOS RAM data next. |
| 85h | The memory size check is done. Displaying a soft error and checking for a password or bypassing WINBIOS Setup next. |
| 86h | The password was checked. Performing any required programming before WINBIOS Setup next. |
| 87h | The programming before WINBIOS Setup has completed. Uncompressing the WINBIOS Setup code and executing the AMIBIOS Setup or WINBIOS Setup utility next. |
| 88h | Returned from WINBIOS Setup and cleared the screen. Performing any necessary programming after WINBIOS Setup next. |
| 89h | The programming after WINBIOS Setup has completed. Displaying the power on screen message next. |
| 8Ch | Programming the WINBIOS Setup options next. |
| 8Dh | The WINBIOS Setup options are programmed. Resetting the hard disk controller next. |
| 8Fh | The hard disk controller has been reset. Configuring the floppy drive controller next. |
| 91h | The floppy drive controller has been configured. Configuring the hard disk drive controller next. |
| 95h | Initializing the bus option ROMs from C800 next. See the last page of this chapter for additional information. |
| 96h | Initializing before passing control to the adaptor ROM at C800. |
| 97h | Initialization before the C800 adaptor ROM gains control has completed. The adaptor ROM check is next. |
| 98h | The adaptor ROM had control and has now returned control to BIOS POST. Performing any required processing after the option ROM returned control. |

| Checkpoint | Code Description |
|---|---|
| 99h | Any initialization required after the option ROM test has completed. Configuring the timer data area and printer base address next. |
| 9Ah | Set the timer and printer base addresses. Setting the RS-232 base address next. |
| 9Bh | Returned after setting the RS-232 base address. Performing any required initialization before the Coprocessor test next. |
| 9Ch | Required initialization before the Coprocessor test is over. Initializing the Coprocessor next. |
| 9Dh | Coprocessor initialized. Performing any required initialization after the Coprocessor test next. |
| 9Eh | Initialization after the Coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key next. Issuing the keyboard ID command next. |
| A2h | Displaying any soft errors next. |
| A3h | The soft error display has completed. Setting the keyboard typematic rate next. |
| A4h | The keyboard typematic rate is set. Programming the memory wait states next. |
| A5h | Memory wait state programming is over. Clearing the screen and enabling parity and the NMI next. |
| A7h | NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000 next. |
| A8h | Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h next. |
| A9h | Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control next. |
| Aah | Initialization after E000 option ROM control has completed. Displaying the system configuration next. |
| Abh | Uncompressing the DMI data and executing DMI POST initialization next. |
| B0h | The system configuration is displayed. |
| B1h | Copying any code to specific areas. |
| 00h | Code copying to specific areas is done. Passing control to INT 19h boot loader next. |